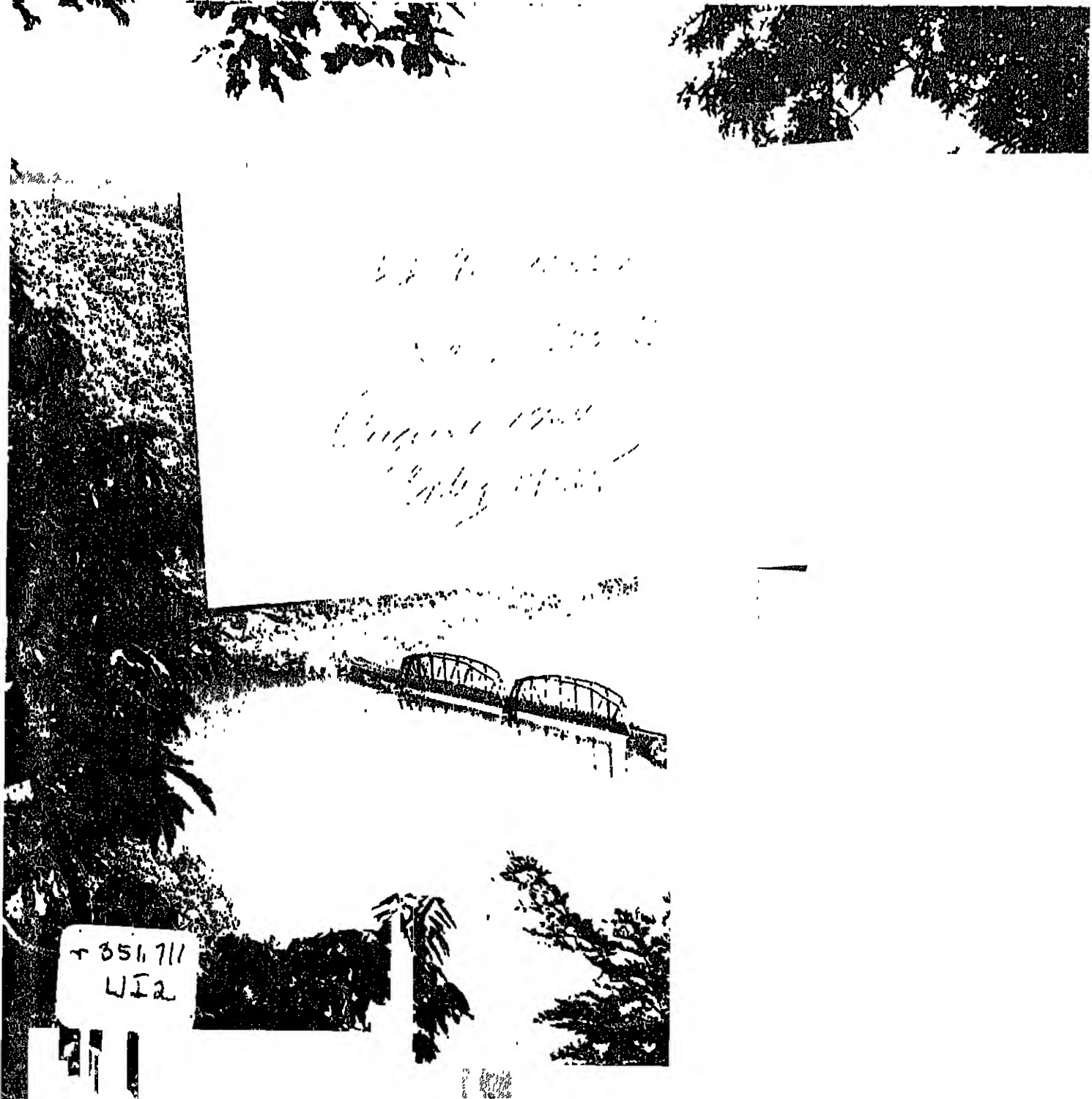


NATURAL RESOURCES OF

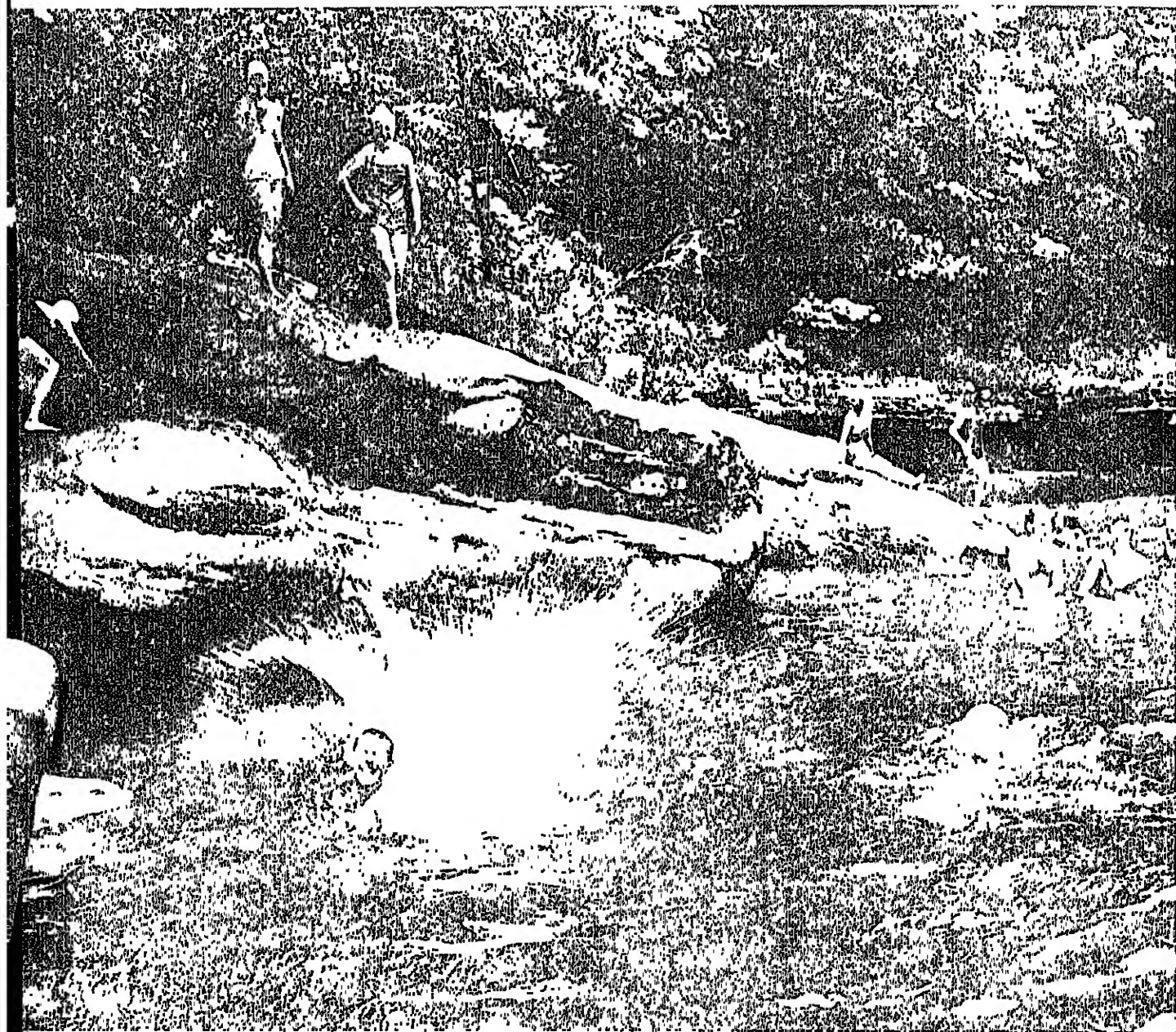
WEST VIRGINIA

Produced by the West Virginia Department of Natural Resources



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(Front cover) Natural beauty is a hallmark of West Virginia. This winding river in a picturesque setting of wooded hills is typical of the Mountain State's scenery.

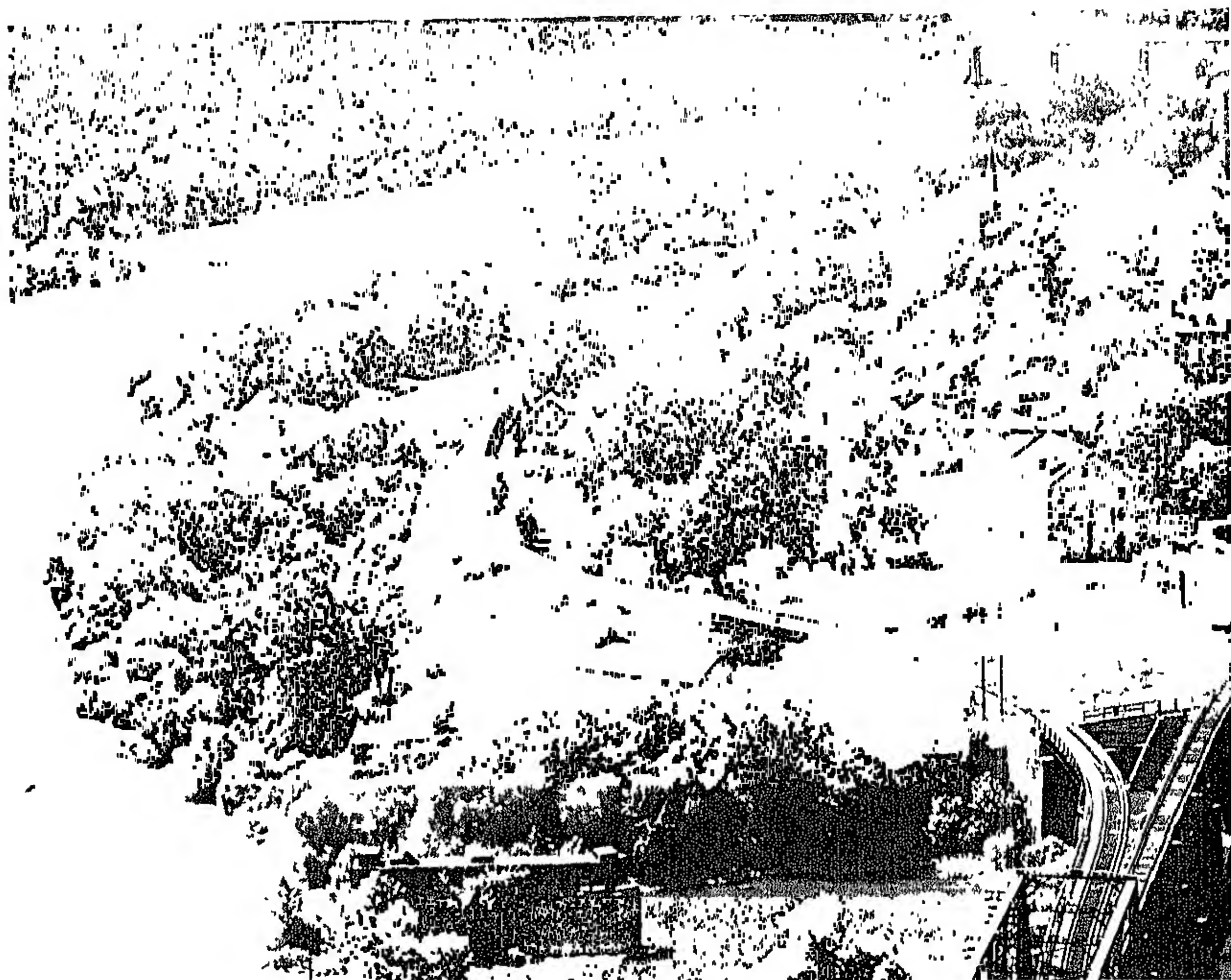


(Above) This natural swimming pool is a popular recreation spot in West Virginia's Monongahela National Forest.



Natural Resources of West Virginia

The Mountain State

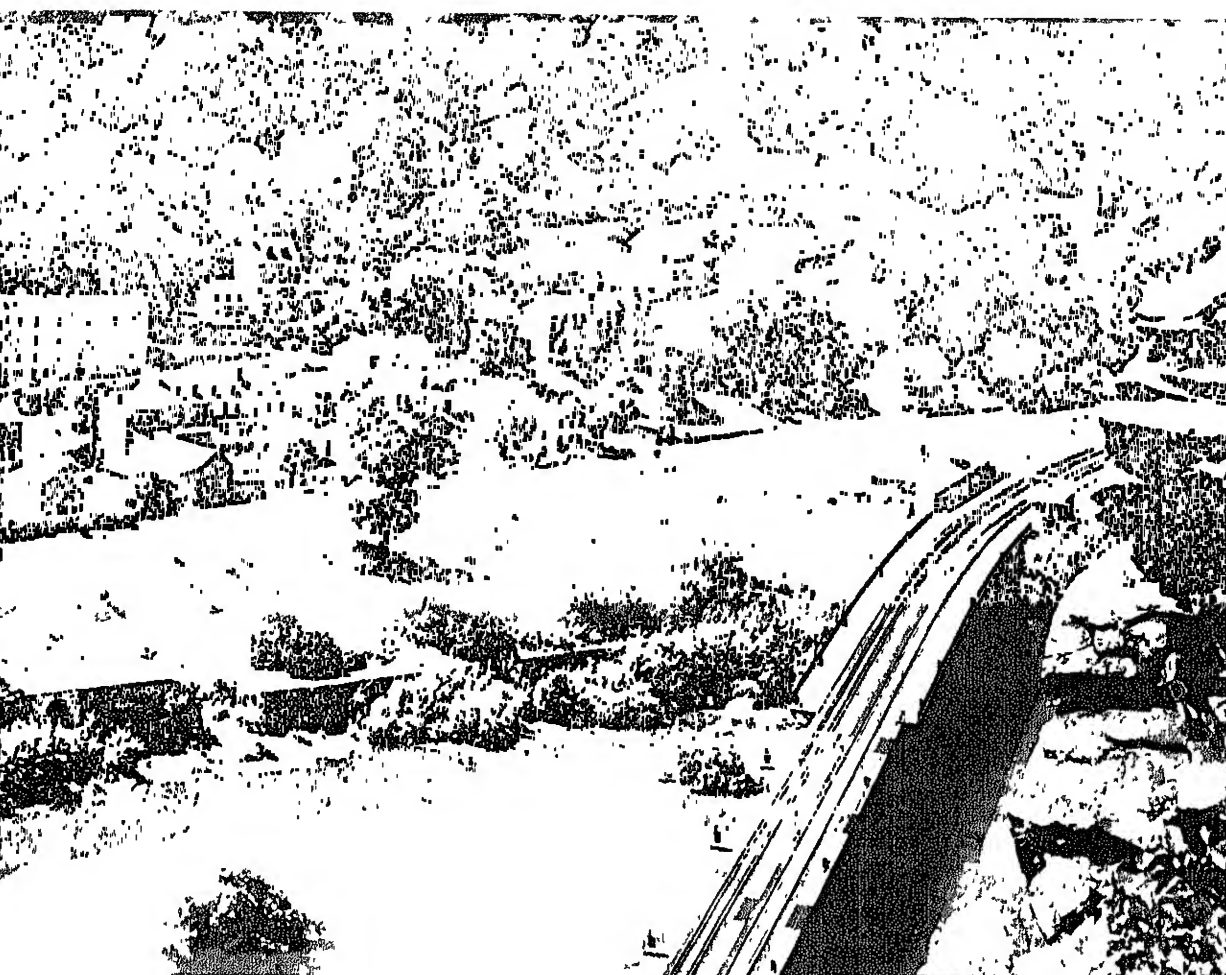


In the Blue Ridge Mountains, Harpers Ferry National Historical Park is a scenic gateway to West Virginia.

The purpose of this booklet is to bring a new awareness on the part of the American people of our rich natural resource heritage, its history, its present, and its future. To know our land is to love it and cherish it and protect it from the ravages both of nature and man.

Stewart Udell

Secretary of the Interior.



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West Virginia is famous for the beauty of its glassware, one of the State's many manufactured products.

Introduction and History

The face of West Virginia, the Mountain State, is a varied one—a land of contrasts. Quiet green hills rise and fall in an endless series of mountainous waves, and bustling manufacturing towns punctuate the valleys between them. West Virginia is at once an area of seeming wilderness and a State of growing activity, proud of its natural beauty, and anxious to develop its resources.

While mountain dwellers still cling to language and customs dating from before the founding of the Republic, urban communities are astir with modern industry, often based on the leading mineral resource, coal. Ancient water-gathering equipment can be found within sight of the newest mining devices. People whose origins can be traced back to mountain clans live near first and second generation immigrants from the Old World. The variety of goods produced in the State includes coal and clothespins, pop bottles and potatoes, plate glass, chlorine, steel, petroleum, and natural gas.

Cities have grown where industry found favorable sites, and in many sections coal has created communities. Charleston is noted for its chemicals; Wheeling for its steel, tobacco, flour; Huntington as a prime rail and distribu-

tion center. West Virginians work today to find new and increased uses for the coal which brought progress to early industry and new settlers to the State.

West Virginia has a wealth of resources on which to grow. Its striking scenic beauty offers open space and recreational resources with unique potential. The State has much to contribute to its own prosperity and to the Nation—steel, coal, transportation by water, rail, and road, an excellent State park system, historic sites of the past, and schools and colleges.

History

The history of West Virginia is interwoven with the major events that shaped the Nation during the colonial period, the early years of the United States, the Civil War, and since.

Earliest recorded dwellers in what is now West Virginia were primitive tribes along the Ohio River and in the Kanawha Valley who have been called "Mound Builders" from evidences of their ancient culture. Mounds have been found containing skeletons, weapons, pipes, pottery, and beads.



However, the State was largely uninhabited when America was discovered and in the early colonial period with the exception of a few Indian tribes living on the fringes of the State area. By and large, the Indians looked upon the land as a hunting and fishing area, as well as a place to gather salt.

With the opening of the New World, early explorers from the coast area, seeking the route to the southern sea in the 1640's, found only rivers, mountains, and endless land. Interest in West Virginia turned to fur trade in the latter 1600's and continued into the next century.

First White Settler

The first permanent white settler in the land that is now West Virginia was Morgan ap Morgan, who received patents to 1,000 acres of land. He took possession about 1726-27 and a few years later began a permanent residence in what is now Berkeley County. Against the threat of confinement to a thin strip along the Atlantic's shores, the English colonial government attempted to open land to the West in the face of rising French claims. Germans from Pennsylvania, as well as Dutch, Scotch, Irish, and English, began settling the land, and by 1747, the population was probably about 200 persons.

From the time of their earliest settlements, West Virginia pioneers had to contend with Indian hostilities, including a savage raid on Draper's Meadows in 1755. Indian troubles continued during the French and Indian War, through the Revolution, until a decisive victory over the Indians was achieved by General "Mad Anthony" Wayne in 1794.

By 1758 the population of what is now eastern West Virginia had risen to an estimated 10,000 freemen and 400 slaves. Forts sprang up to protect residents against Indian raids, and despite the many hazards of frontier life, settlers continued to pour into the area. Population rose to 30,000 by 1775.

The principal coastal issues of the Revolutionary War were of little interest to the frontiersmen of western Virginia, but they were entirely sympathetic with the freedom-



Forested mountains slope gently into a fertile valley and a patchwork of farms lines a country road.

West Virginia's alluring mountain streams offer natural beauty and trout fishing for outdoorsmen.



seeking cause of the colonists. During the war, Indians, spurred on by the British, increased the ferocity of their attacks, and British forces made three major invasions of the State.

New Growth

Old settlements grew after the war, and new ones appeared in the western area of Virginia. The opening of the Mississippi River brought further development, although settlers waged a constant battle against hunger in the raw wilderness. Population in 1800 was nearly 80,000.

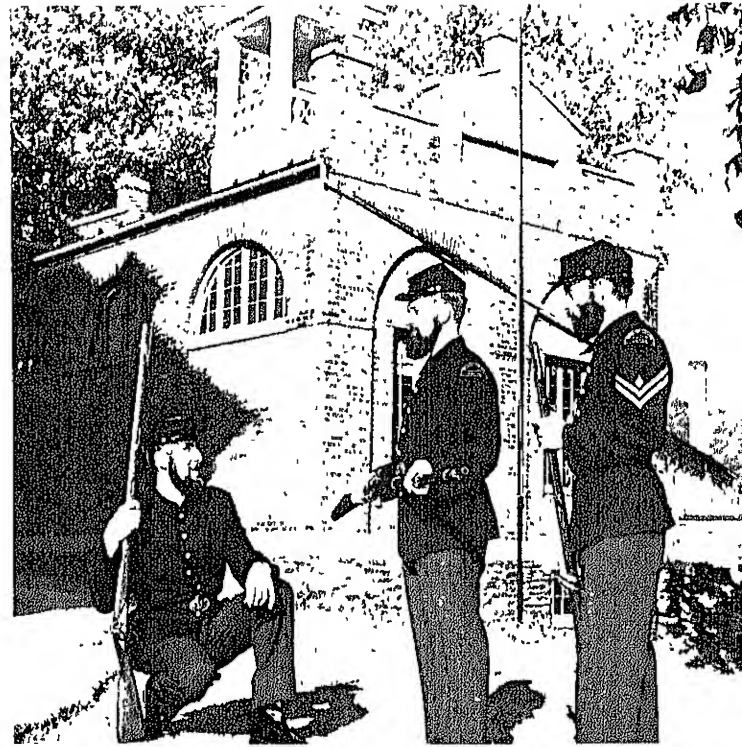
There were few law-enforcement facilities in the area, and portions of the State area were being claimed by both Virginia and Pennsylvania—a dispute later settled when the Mason-Dixon line was surveyed, leaving the bulk of the area as part of Virginia. Furthermore, the frictions which later led to the emergence of West Virginia as a separate State were developing. Calls in the early 1800's were made for the formation of a State—one suggestion for a name was Vandalia; another was Westsylvania.

After 1800, a new emphasis on permanent settlement—as contrasted with the backwoods pioneer—got underway. In 1817 Wheeling was the construction site of the first really successful river steamboat, and the following year a railroad was completed. The true pioneer, intolerant of the enlarging population and civilization, moved westward, seeking new frontiers beyond the Ohio River.

Freight and new settlers moved over the new railroads. Infant industry developed. The production of salt, lumbering, and the discovery of coal in 1817 brought new progress. While Virginia was still primarily an agricultural area, many mills were built to process wool. Other small industries also developed.

Frictions of the Times

The friction between the westernmost area and the remainder of the State of Virginia increased. Taxation was considered unfair because slaves were undervalued for tax purposes and the westerners, who owned few slaves, felt they were carrying more than their share of taxes.



Preparing to re-enact John Brown's Raid, Federal "soldiers" pose near Fire House at Harpers Ferry.

Representation in the Virginia Legislature was not proportional, and funds for public works were apportioned unfairly with nearly all government buildings being located in what is now Virginia itself.

A constitutional convention to separate the western area from Virginia was called in 1829—unsuccessfully. Another was called in 1850, and some concessions—notably on representation in Virginia's House of Delegates—were won.

As the darkening clouds of civil war formed over the Nation, the New England statesman Daniel Webster warned the Virginia leaders that if they became involved in the growing secession movement the western part of the State would break away. Webster's admonition led to more concessions from Richmond.

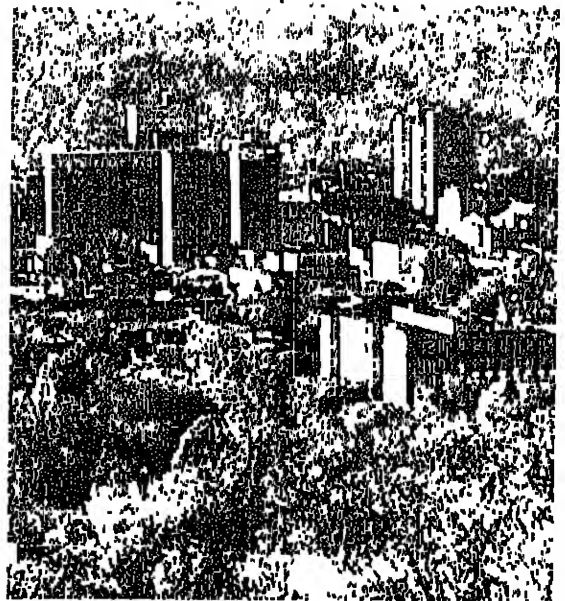
Then came John Brown's raid at Harpers Ferry. Brown, a militant abolitionist, seized the arsenal at Harpers Ferry in October 1859, intending to start a slave uprising. He was captured by forces under the command of Robert E. Lee, and, in December, was hanged for treason.

The firing on South Carolina's Fort Sumter in April 1861 sparked a series of secessionist resolutions in southern State capitals. Although defeated in an earlier vote, a secession measure was passed in the Virginia Legislature on April 17. The majority of the legislators from what is now West Virginia voted against it. They met secretly and resolved to keep their portion of the State loyal to the Union.

Several conventions were held in the State area, a vote on secession was taken, and early in April 1862, a constitution was ratified. President Lincoln, by a proclamation issued April 20, 1863, made West Virginia a separate State.

Principal Cities

Beckley	Martinsburg
Bluefield	Morgantown
Charleston	Moundsville
Clarksburg	Parkersburg
Dunbar	South Charleston
Fairmont	Weirton
Huntington	Wheeling

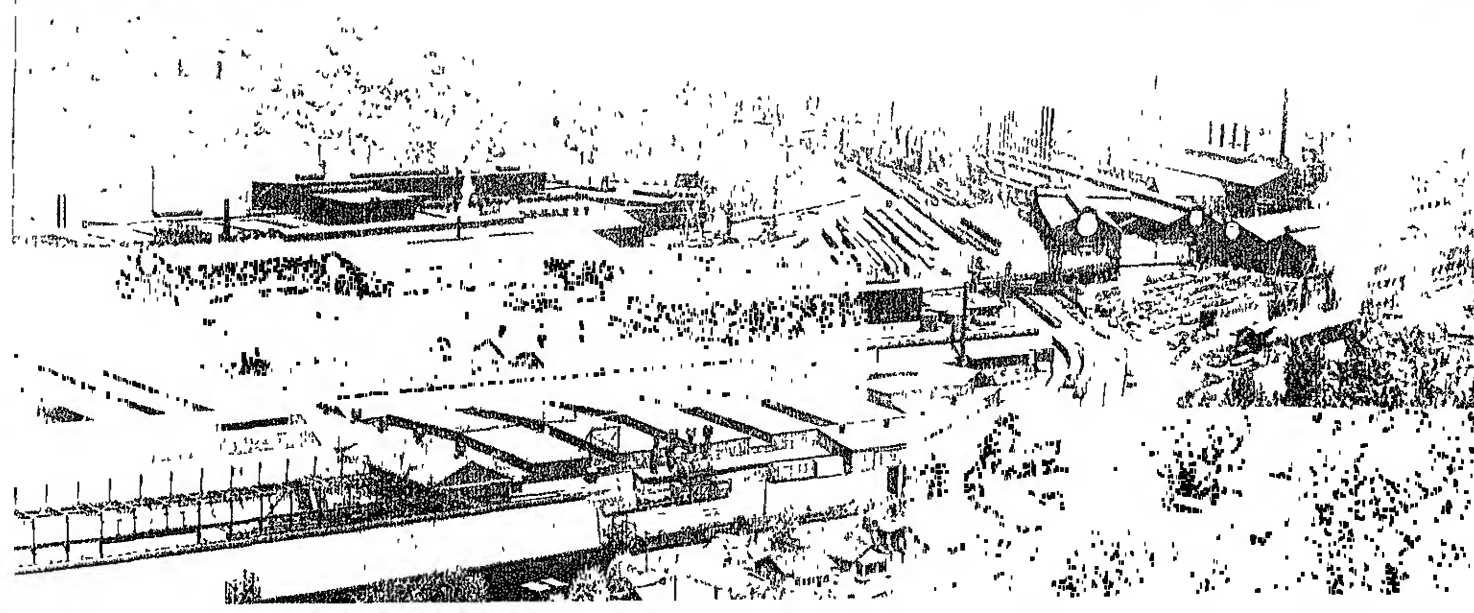


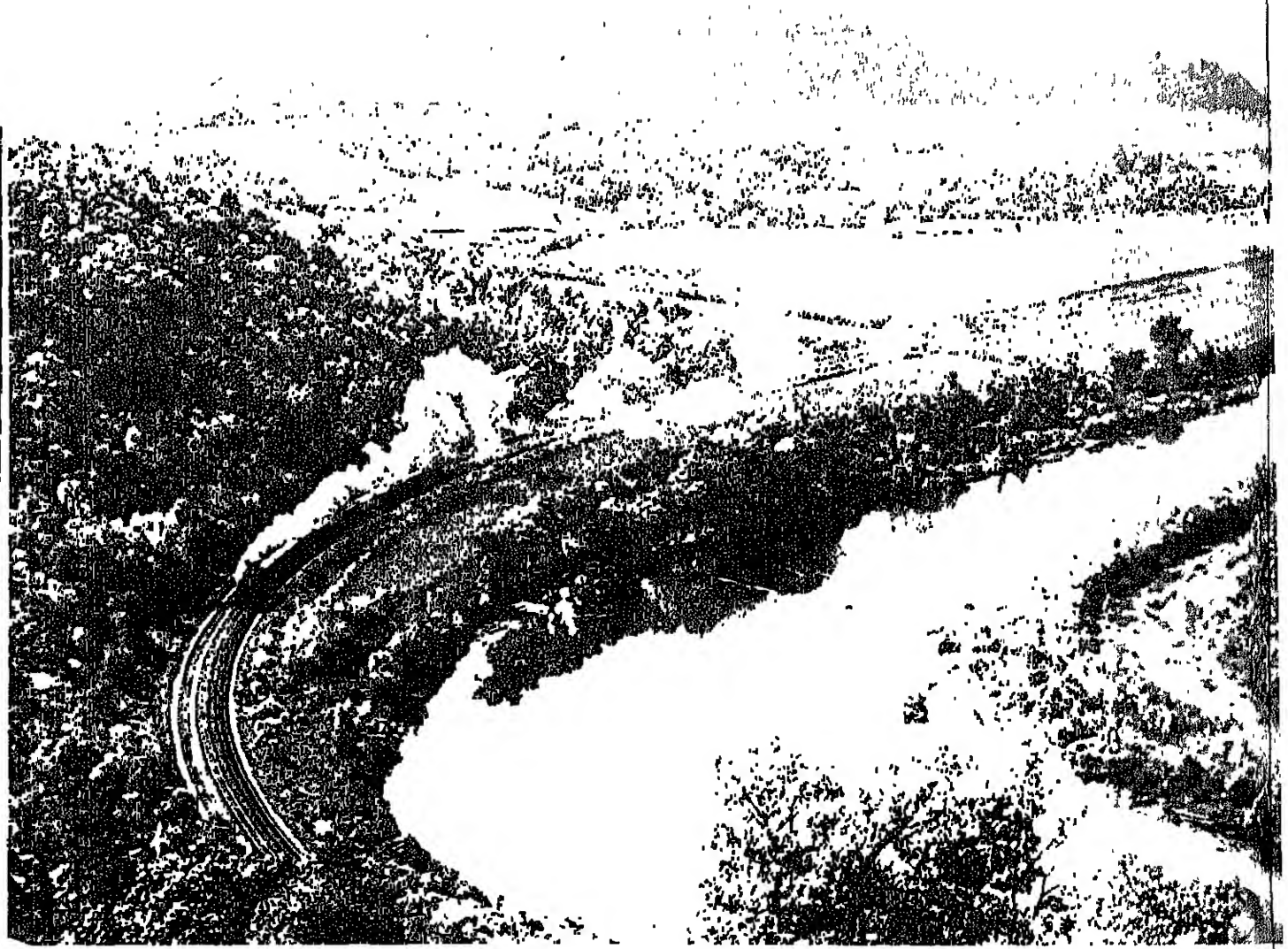
Huntington, at the west edge of West Virginia, is a major rail and thriving industrial center.

(Upper right) Wheeling, one of West Virginia's large cities, includes an island in the Ohio River.

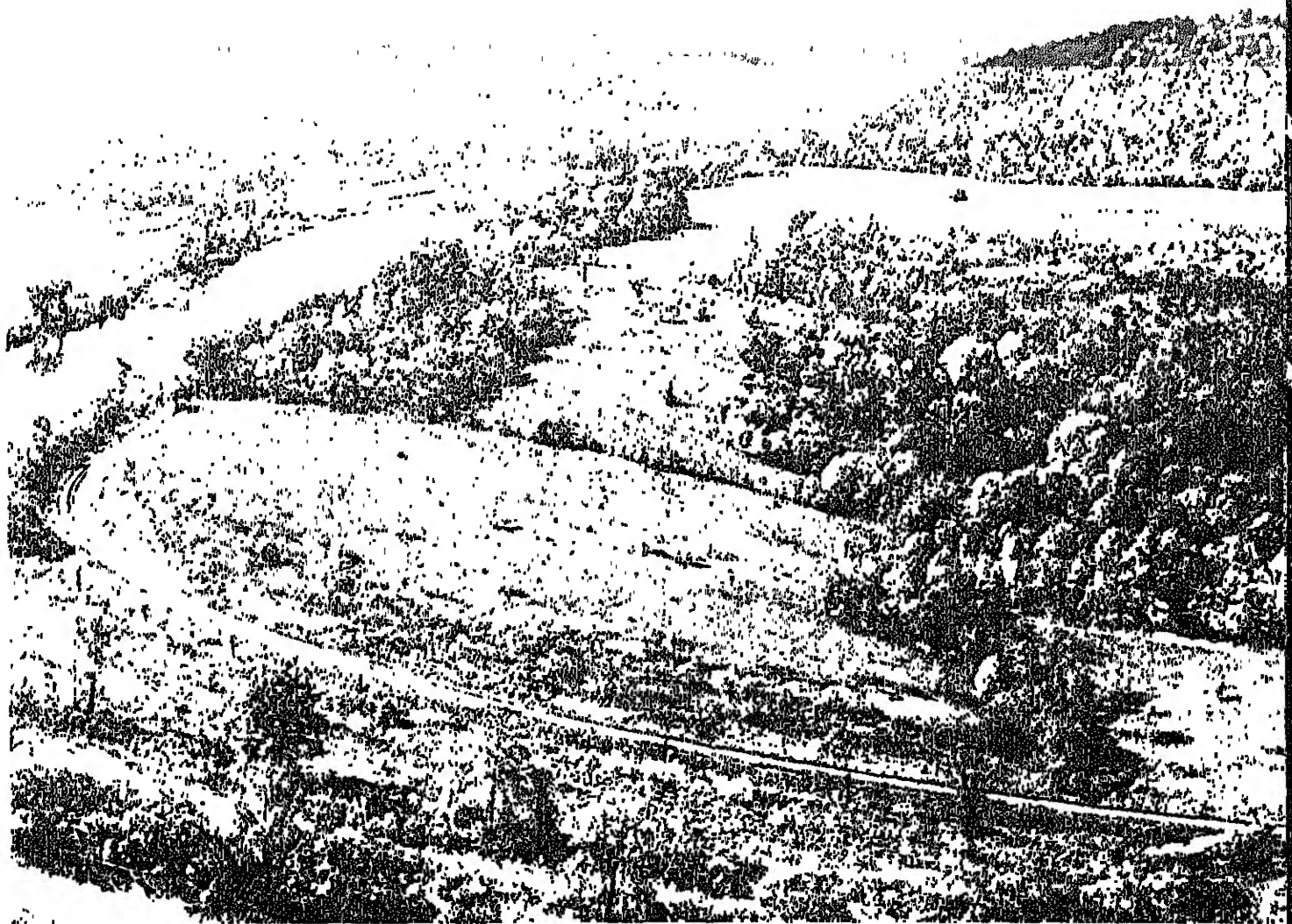
(Center right) Charleston, on the Kanawha River, is the State Capital and a large industrial complex.

(Bottom right) This Weirton plant is one of many that make West Virginia a major steel producer.





Physical Characteristics



The Mountain State's boundary, 1,170 miles in total length, generally follows rivers and mountain ranges, and encloses an area of 15,411,200 square acres that includes some striking geographical contrasts.

Slightly to the east of West Virginia is Baltimore, Md.; in the west the State extends nearly to Columbus, Ohio; to the south, almost to Norfolk, Va., and the northern edge of West Virginia rises beyond Pittsburgh, Pa.

Thus, it is little wonder that West Virginia

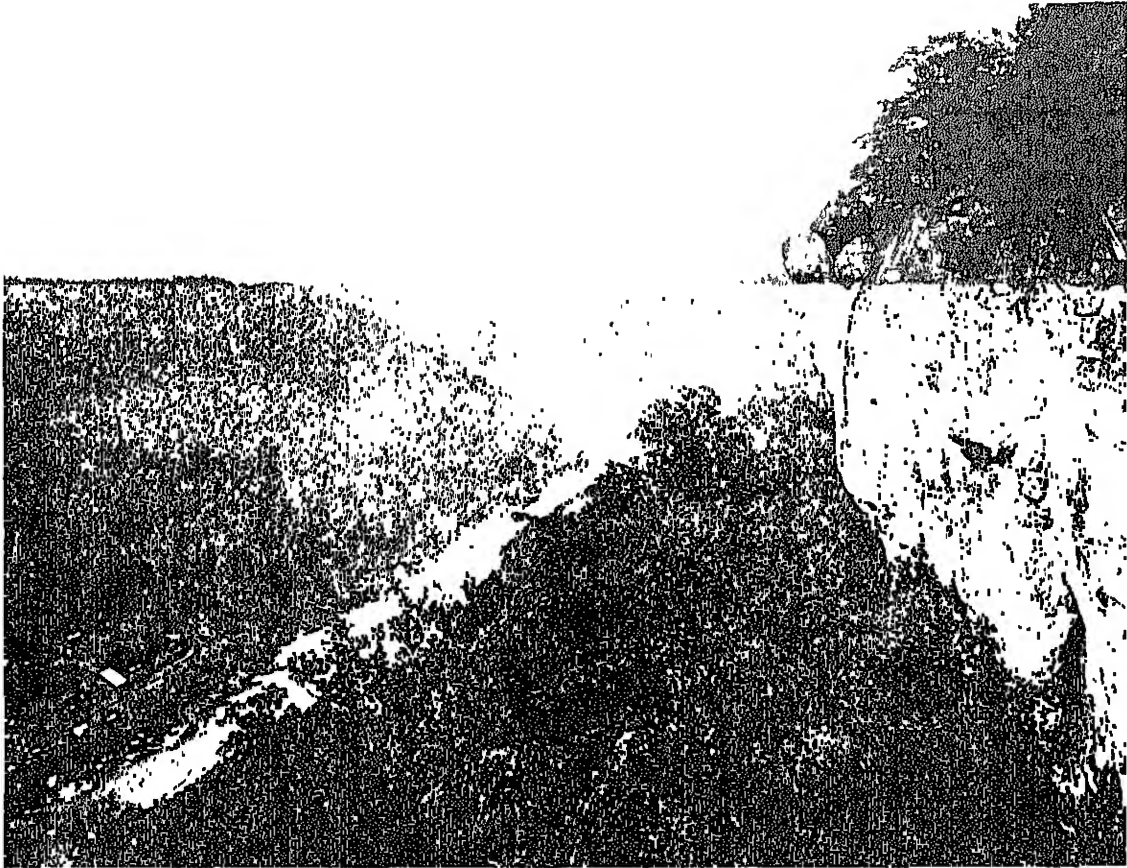
has been called the most southern of the northern, northern of the southern, eastern of the midwestern, and western of the eastern States.

Elevation ranges from a little over 240 feet above sea level at Harpers Ferry to over 4,800 feet at Spruce Knob—with an average elevation above sea level of 1,500 feet, higher than any other State east of the Mississippi River.

West Virginia's rivers and streams flow into the Ohio, Monongahela, New, Kanawha, James,



The Elk River flows peacefully through the heavily wooded Monongahela National Forest where its headwaters originate.



Spectacular scenery along West Virginia's New River is created by sheer sandstone cliffs overhanging the valley.

and Potomac Rivers. Portions of some of these rivers are navigable.

The climate of West Virginia is typical of the Middle Atlantic Appalachian Belt—warm summers and cool winters. Because of the wide variety of altitudes, rainfall and temperature vary greatly within the State. Mean temperatures range from 56° in the south to 48° in the higher mountain regions. From January to July the mean temperatures range from about 30° to 75°, with much colder and warmer temperatures recorded.

The plant life of West Virginia also abounds in contrasts. About three-fourths of the State is forested. Mountains are capped with evergreens rising above the beech, maple, oak, and hickory. Cranberries, chokeberries, mosses, ferns, and liverwort can be found.

Rhododendron, the State flower, abounds, as does the laurel. With more than 200 flowering trees and shrubs, West Virginia is a picturesque natural wonderland. The State's floral beauty begins in April and May and lasts through November in some areas.

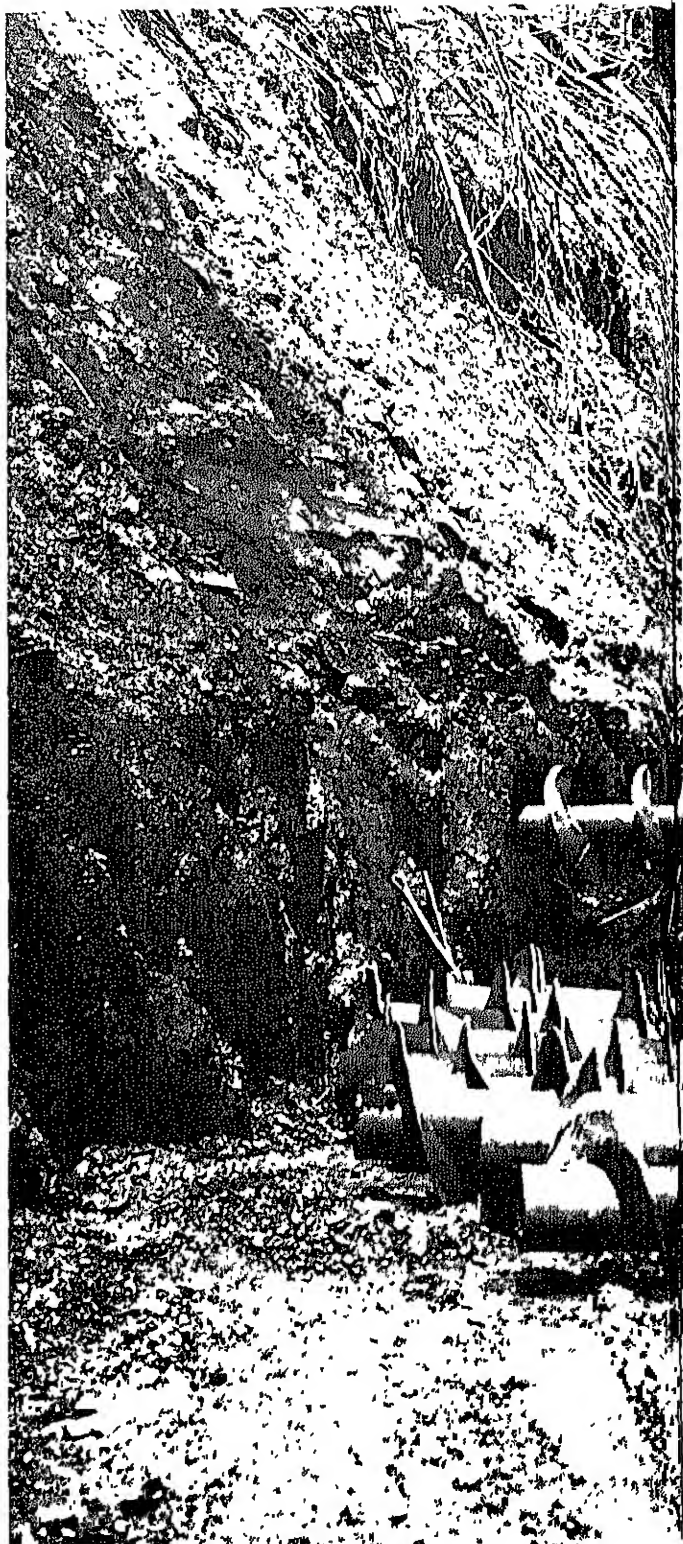
Mineral Resources

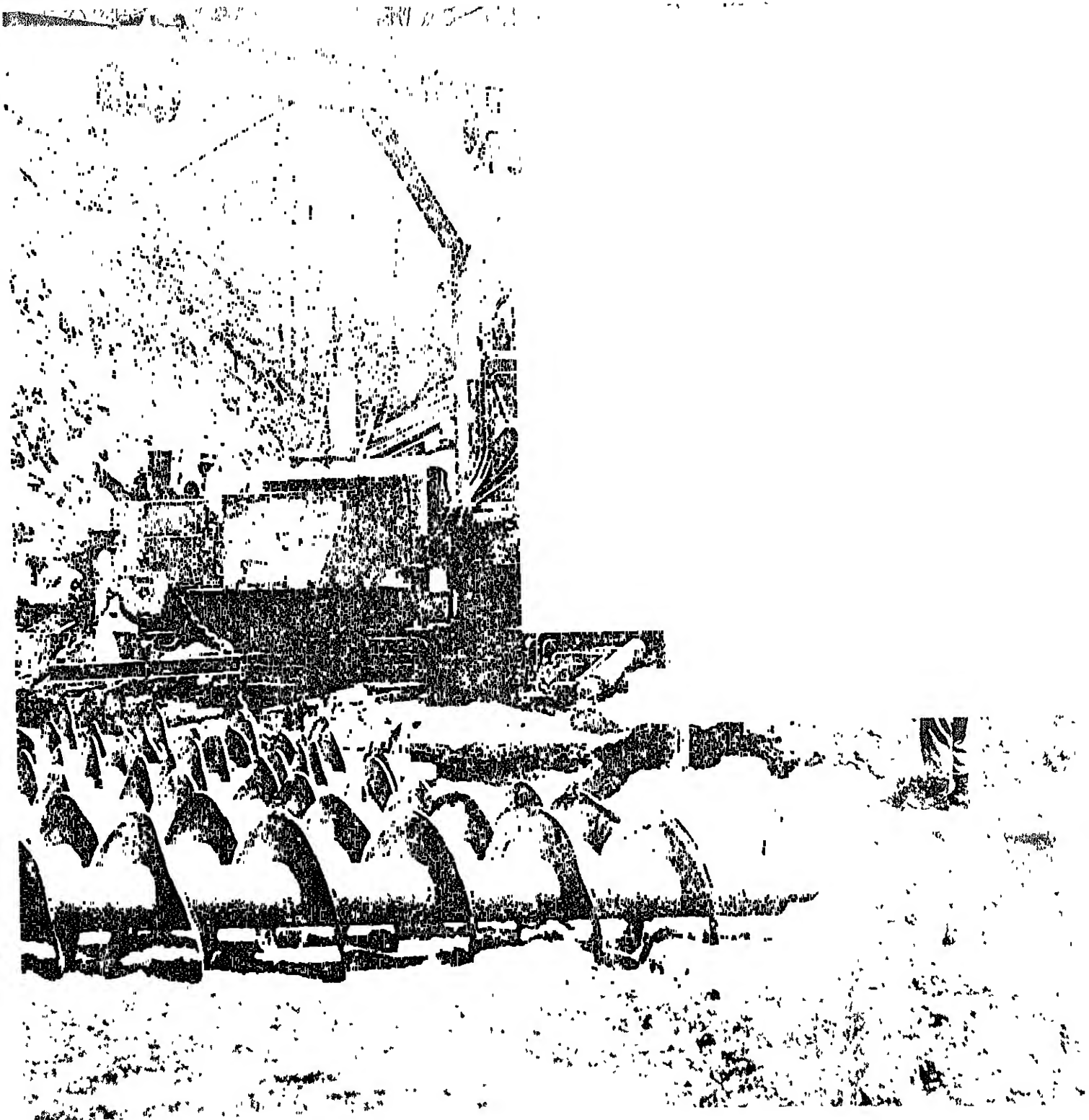
The mineral resources of West Virginia have long been important to the economy of the State. They consist chiefly of coal, natural gas, petroleum, salt, and stone suited to construction and other uses. All occur as layers or as constituents trapped in layers of the sedimentary rocks that underlie the State.

Bituminous coal is West Virginia's greatest mineral resource. Extensive coal deposits underlie parts of all counties in the State except those of the southeastern tier. More than 6 billion tons of coal have been produced, and current production, over 100 million tons a year, is larger than that of any other State. Approximately 100 billion tons of bituminous coal remain in the ground, affording ample resources for a continued major industry.

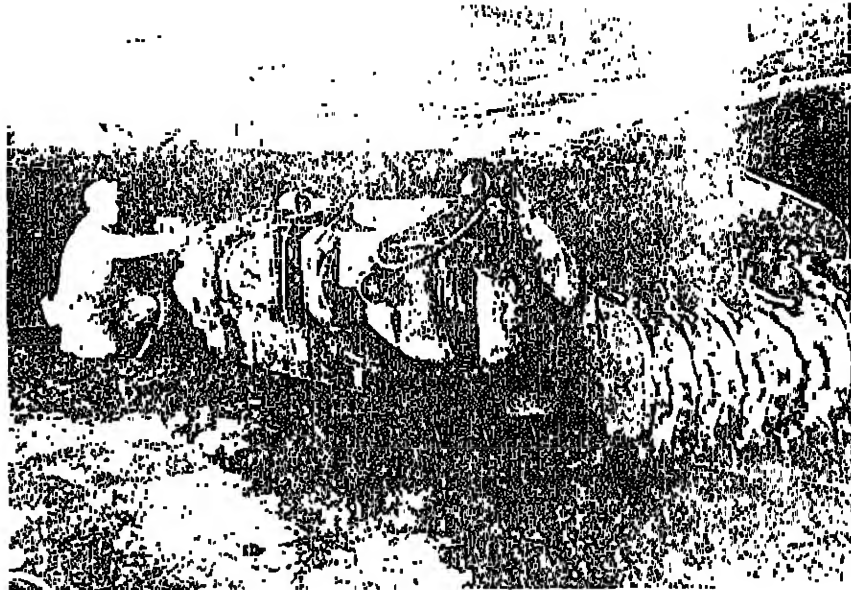
Petroleum was first produced in West Virginia around 1876. Since then extensive fields of petroleum and natural gas have been developed. Principal development has been in the western part of the State where many shallow fields were found near the turn of the century. Although West Virginia is now only a minor producer of oil, output of gas has remained at a high level. Natural gas ranks second (approximately 209 billion cubic feet) and natural gas liquids third in its average annual mineral product values.

West Virginia is the Nation's leading producer of coal. Here augers bore into seams to economically mine coal that might otherwise not be recovered.





Tapping the State's vast coal deposits requires modern equipment such as this machine which operates in thin seams.



Proved reserves of petroleum and natural gas liquids are about 110 million barrels, and proved reserves of natural gas are 2 quadrillion cubic feet. Deeper drilling in the eastern part of the State may locate much undiscovered gas. It is possible that recoverable petroleum also remains to be found.

Salt is extensively produced in West Virginia, mostly by means of brine wells. Natural brines are found trapped in porous sandstone throughout the western counties; commonly these brines are associated with petroleum and natural gas. Thick beds of rock salt occur at depths of several thousand feet below the surface in several northern counties.

Stone for construction and other uses is widely distributed. Limestone crops out widely in belts in the eastern counties and is common also in the west. The better grades of limestone are used in cement, for flux, and for lime burning. Less pure limestone is used as dimension stone, crushed rock, and agricultural lime. Sandstone is widely used for dimension stone and crushed rock. Clay and shale suited for brick and tile are widely available. Pure quartz sands from eastern West Virginia are utilized as glass sands. Molding sands are available at many places. Extensive deposits of sand and gravel occur in terraces and flood plains of major rivers; many of these deposits are worked for aggregate.

Mineral Industries

West Virginia ranks sixth among the States in the dollar value of its annual mineral production—about \$700 million annually. Only oil-rich Louisiana, tapping petroleum far beneath the Gulf of Mexico, produces more mineral wealth than West Virginia in proportion to its size. East of the Mississippi River, West Virginia is exceeded in mineral production only by Pennsylvania.

West Virginia's 55 counties share to some degree in mineral production. Nine out of ten counties usually report one or more major tonnage items such as coal, stone, or sand and gravel. The others have wells producing gas or oil.

Coal

For over a quarter of a century, West Virginia has led the Nation in tonnage and value of bituminous coal mined. Its tremendous coal reserves, combined with a large force of trained manpower, and excellent river and rail transportation should enable the Mountain State to retain this lead for many years to come.

Most of West Virginia's coal is mined underground. Well over 90 percent is loaded mechanically, and almost a third is produced by continuous mining machines. As the larger mines are being further mechanized wherever possible,

many new small mines are being opened to produce coal for local use. About three-quarters of the total coal output is mechanically cleaned.

Because of its wealth of coal, West Virginia is the home of the first large-scale mine-mouth generating plant. This plant, on the Stony River near Bismarck, Grant County, will receive its fuel from new mines in the immediate area. Using about 3 million tons of coal a year, the 1,080,000-kilowatt installation will send its power to Virginia population centers on a 350-mile extra-high-voltage circuit of the Virginia Electric Power Co. The mine-mouth technique, made possible through recent advancements in extra-high-voltage transmission, avoids transportation costs encountered when coal is moved to generating stations closer to metropolitan areas.

West Virginia, with its tremendous reserves of coal, is capable of serving many mine-mouth generating plants.

West Virginia is also the Nation's largest producer of metallurgical coke, much of which is shipped outside the State.

Oven-coke plants in West Virginia carbonize approximately 4 million tons of coal a year, of which 3 million tons come from Pennsylvania mines. In addition to nearly 3 million tons of coke, products of these plants include 170,000 tons of coke "breeze," or fine particles, and 47 billion cubic feet of coke-oven gas. Coal chemicals produced include ammonium sulfate, tars, and crude light oils yielding benzene, toluene, xylene, and naphtha.

Petroleum and Natural Gas

Petroleum and natural gas were first discovered in the Appalachian field which underlies all except the easternmost counties of West Virginia. In the early days, however, drilling was not as deep and cores and wells were not examined as thoroughly as today. As a result new discoveries of both gas and oil continue to be made and there is much petroleum drilling today, even in the older fields. In a typical year, licenses to drill for gas or oil are obtained

in 45 counties and new wells are completed—either producing or dry—in 40 or more. This estimate is, of course, subject to upward revision.

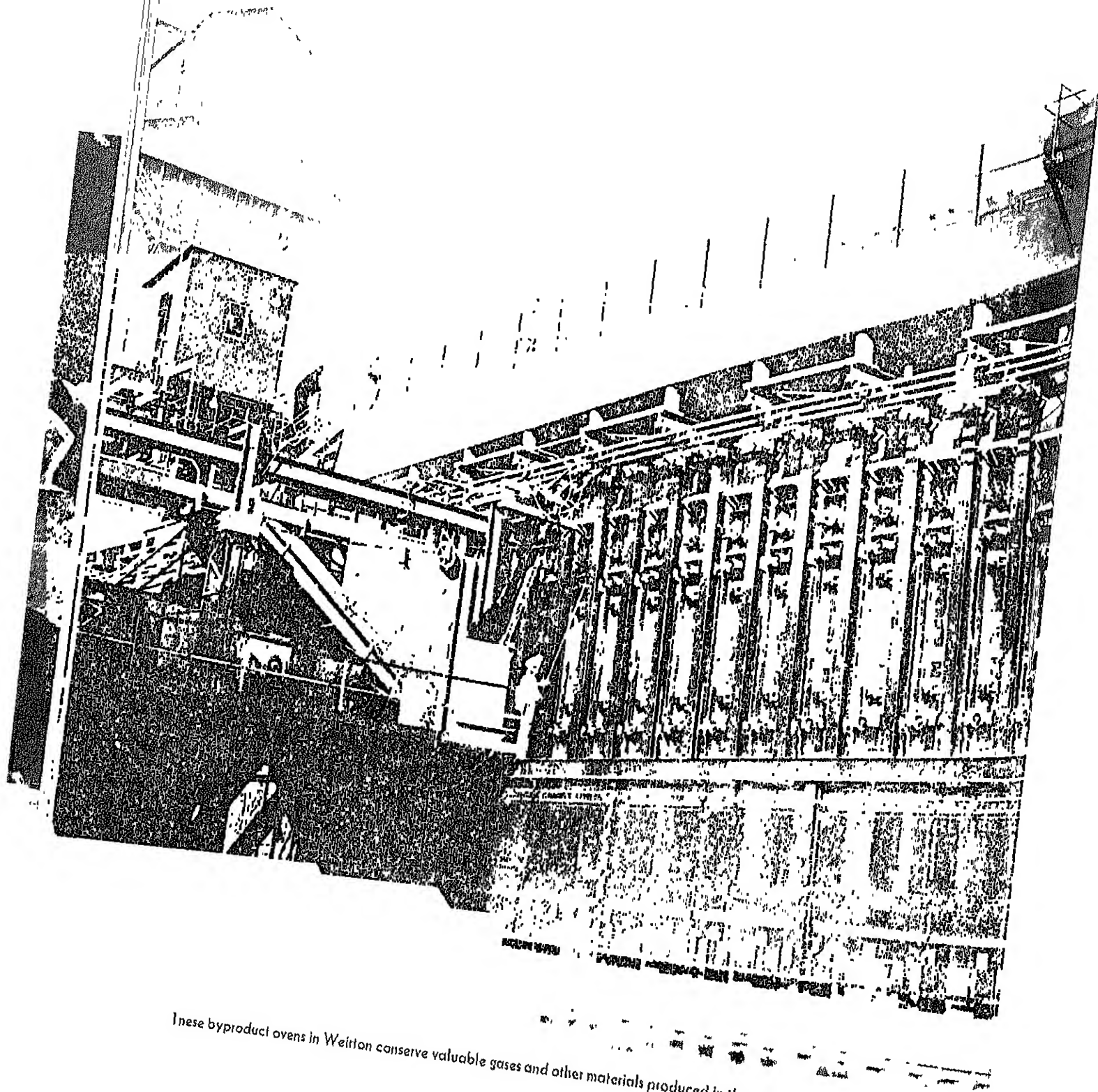
Salt

Common salt and other natural salines are produced from brine wells in the Ohio and Kanawha Valleys. Demand for chlorine, the principal chemical derived from salt, continues to expand, and West Virginia now ranks seventh nationally in volume of annual salt production.

Brines from wells at South Charleston in Kanawha County are processed to produce elemental bromine and various bromine compounds, ethylene dibromide, and the "double salt," calcium-magnesium chloride. Marshall and Kanawha Counties supply salt in brine



Limestone caverns yield raw materials for steel production and other industries in West Virginia.



These byproduct ovens in Weirton conserve valuable gases and other materials produced in the conversion of coal to coke.

form to chlorine manufacturers, and Mason County produces evaporated salt for animal-feed dealers and water-softener manufacturers.

Other Mineral Products

Lime made by burning West Virginia limestone is being used increasingly for chemical and industrial purposes. It is made in Jefferson and Berkeley Counties, near the State's one large cement plant. Fire clay is mined in Kanawha and Hancock Counties, while miscellaneous clays are produced commercially in Berkeley, Cabell, Mercer, Lewis, and Taylor Counties.

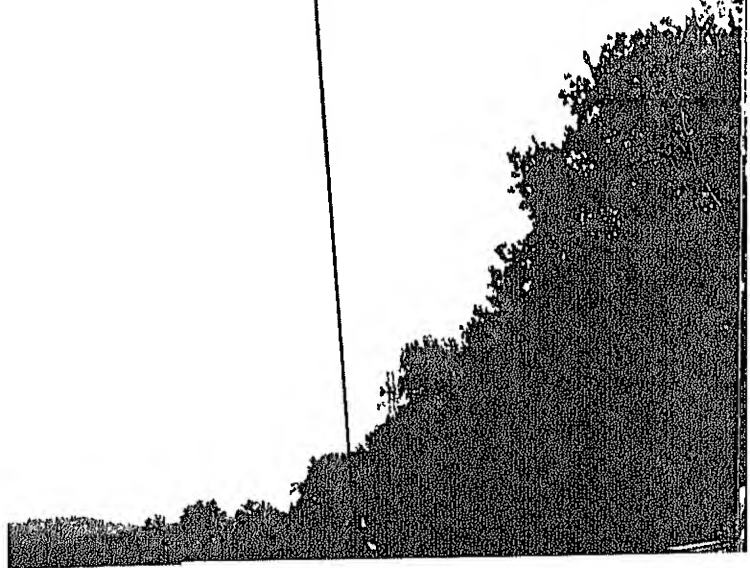
Mineral-Processing Industries

Abundant supplies of cooling water, as well as inexpensive transportation for coal and raw materials, account for the concentration of mineral-processing industries along West Virginia's three navigable rivers. The Ohio and its tributaries, the Great Kanawha and the Monongahela, are also well supplied with railroads and highways along their banks.

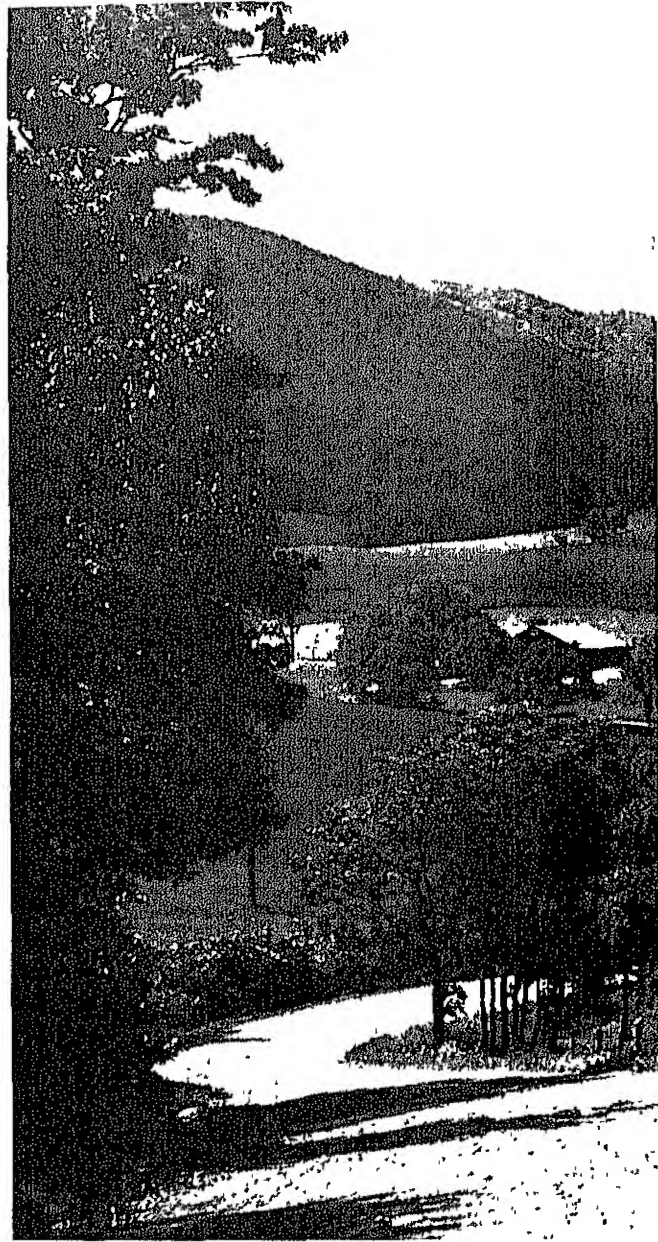
Iron ore, chiefly from Minnesota but sometimes from Canada or even farther away, is shipped to Weirton and Benwood from Lake Erie ports. Iron ore development of considerable potential is proceeding in Greenbrier County. However, most of the limestone used in steel mills of northern West Virginia is native to the State. Annual steel capacity is over 3½ million tons. Alumina from Louisiana, processed from Jamaica and Surinam bauxite, is made into primary aluminum with the aid of low-cost electricity from West Virginia coal at Ravenswood in Jackson County.

Electricity from coal also makes steel from iron and steel scrap in electric furnaces at Huntington. Zircon from Florida becomes zirconium metal for atomic reactors and other uses at a Wood County metals plant. Zinc is smelted at Meadowbrook, and ferroalloys are produced at Alloy.

West Virginia's rivers afford low-cost transportation to the State's mineral industries. Here, a barge loads ore on the Ohio River.



Land Resources



With rich soil, good climate, and long growing season, West Virginia has a wealth of natural resources in its agricultural and forest lands.

West Virginia has approximately 42,000 farms covering roughly 6.5 million acres, or about 40 percent of the State's land area. The farms have an average value, in terms of land and buildings, of more than \$12,000 each.

Farm marketings for a recent year were valued at \$99 million, including \$77 million for live-

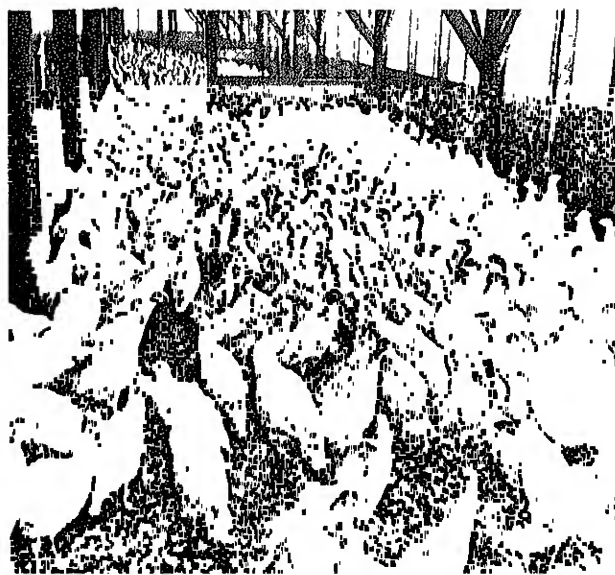
stock and \$22 million for crops. The value of farm products, according to the source of sales, is in the following order: Livestock and livestock products, poultry and poultry products, dairy products, fruits and nuts, field crops, forest products, horticultural specialties, and vegetables.

The State's farms have about 832,000 acres in cropland, 1 million acres in pastured woodland, and about 1.5 million acres in woodland.



Farms cover about two-fifths of the State's land. The rolling farmland is well suited for livestock.

Poultry production—both turkeys and chickens—is important in West Virginia's agricultural economy.





Other cropland is in pasture and soil-improvement crops.

The farmers of West Virginia are important customers for products coming from all over the Nation, spending some \$24 million for poultry and livestock feed and nearly \$5 million for oil and gasoline products for farm use. Purchases of fertilizers and the many other products needed in modern farming bring the annual total to more than \$110 million.

In the order of the number of farms operating in West Virginia, the livestock farms are first, followed by dairy, poultry, field cropping, general, tobacco, cash grain, and vegetable.

Many Federal and State agencies aid farmers in West Virginia in conserving soil, water, forests, and wildlife.

In West Virginia, the U.S. Department of Agriculture's Soil Conservation Service is assisting more than a dozen locally organized and managed soil conservation districts that include over 15 million acres and have about 37,000 cooperators operating more than 6 million acres. The Soil Conservation Service also assists many watershed protection and flood prevention projects.

The Federal Government, through another Department of Agriculture agency, the Agricultural Stabilization and Conservation Service, shares with farmers and ranchers the cost of many conservation practices.

The Forest Service, also of the Department of Agriculture, cooperates with West Virginia in protecting and managing more than 9 million acres of State and private forests. Technical and financial aid to small woodland owners is provided through the State forester, who administers cooperative programs.



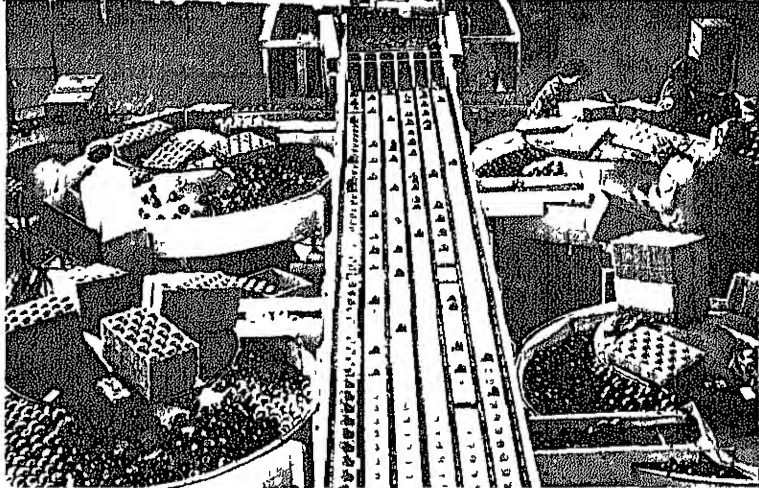
Principal Products

Cattle	Corn	Vegetables
Sheep	Small grains	Berries
Chickens	Hay crops	Apples
Hogs	Potatoes	Peaches
Milk	Oats	Cherries
Eggs	Tobacco	

(Left) Sheep play an important role in the State's livestock production program.

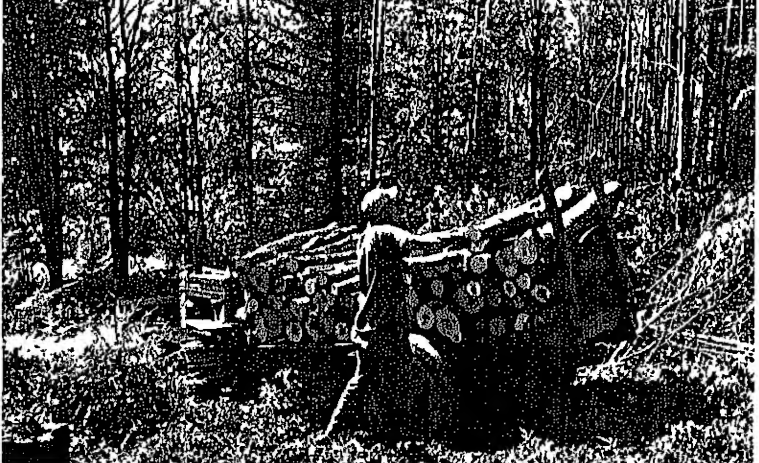


(Right) Apples are prepared for packing. The eastern part of West Virginia is famous for its orchards.



(Left) A forester explains to students of West Virginia University why this white pine tree was marked for cutting.

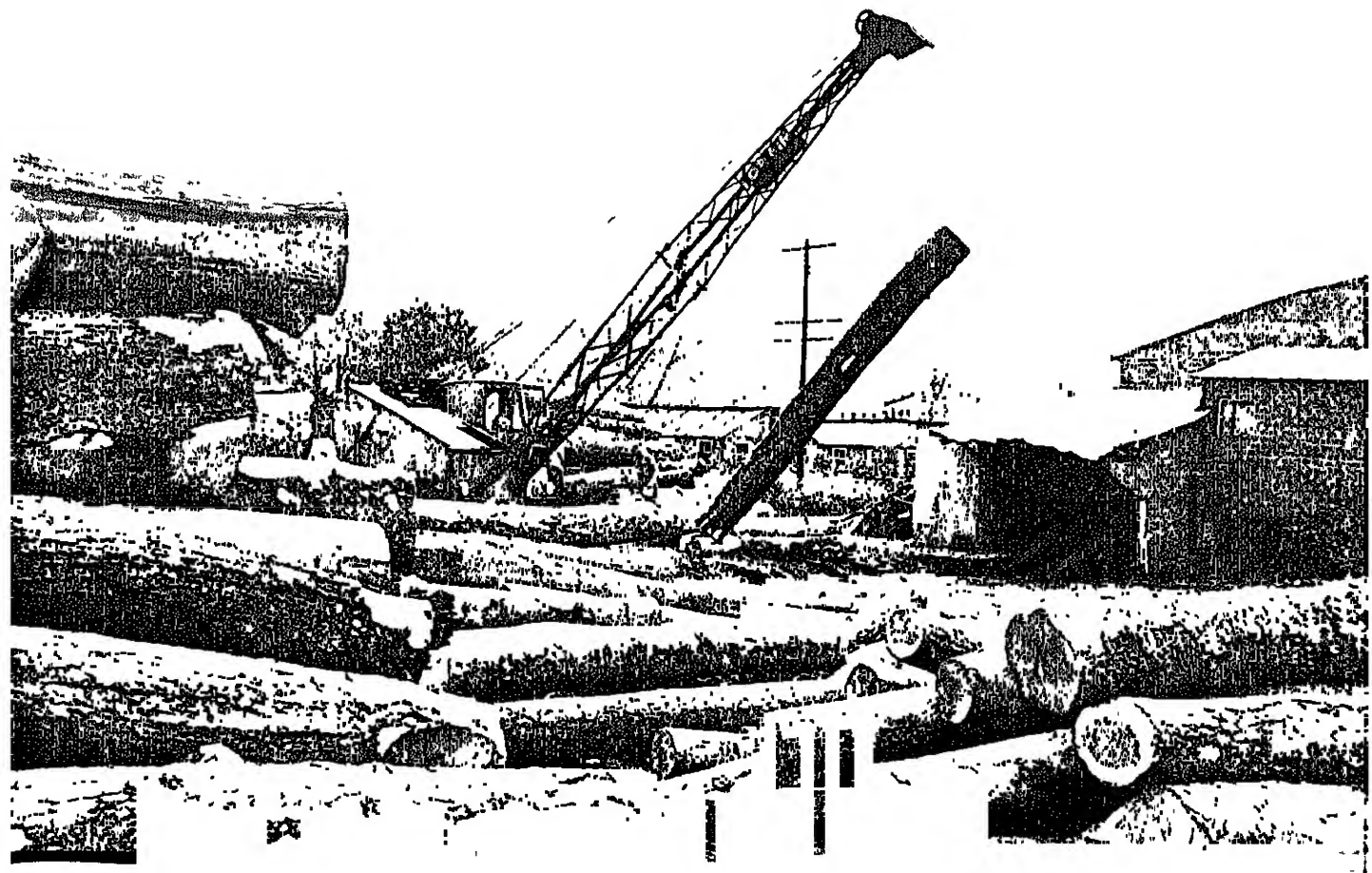
(Right) This pulpwood being loaded from West Virginia forests will be used in the manufacture of paper, an industry in the State since 1830.





Corn shocks signal harvest time at this valley farm. Corn is one of West Virginia's principal agricultural products.

Hardwood, the most valuable timber from the State, is unloaded at a mill where it will be used to produce flooring.



West Virginia's forests early attracted the burgeoning American lumber industry, and the State's oak became in great demand at home and abroad. With expansion of the railroad system and the rapid growth of heavy industries, forests were almost forgotten as attention was focused on rich coal, oil, and gas fields beneath the forest-clad mountains. Today, the Nation's and the world's mounting demand for wood is returning forests to a position of importance in West Virginia's economy. The State's forests now supply raw material for industries that provide full-time jobs for over 13,000 persons with an annual payroll of \$43 million. Timber products are worth over \$6 million each year, and farmers sell nearly \$2 million worth of forest products from their woodlots.

West Virginia has a promising future in the development of its forest wealth. Of West Virginia's total land area, forests cover 11,460,000 acres, or about 74 percent of the State. In the fertile agricultural areas of the Ohio River and the Shenandoah Valley the forests are scattered, forming a patchwork among the farms. In the mountainous areas of the southern and eastern parts, the forest is almost unbroken except for streams, occasional small farms in the narrow valleys, towns, and coal camps.

Practically all of the forest land—11,389,000 acres—is classed as commercial. Forests grow chiefly on steep slopes too rugged for farming or other uses. Nine-tenths of the State's forest land is in private ownership, and State, local, and Federal governments own the remaining 10 percent. The Federal Government is the largest governmental owner with 895,000 acres, nearly all in the Monongahela and George Washington National Forests.

Hardwood species predominate, covering 89 percent of the commercial forest area. Oak types occupy about half the forest lands, including red, chestnut, and white oak. Yellow poplar, sugar maple, beech, and yellow birch thrive on the banks of streams. Softwoods include hard pine, pitch pine-Virginia pine, and spruce.

Hardwood lumber is the chief product of West Virginia forests. The State ranks high

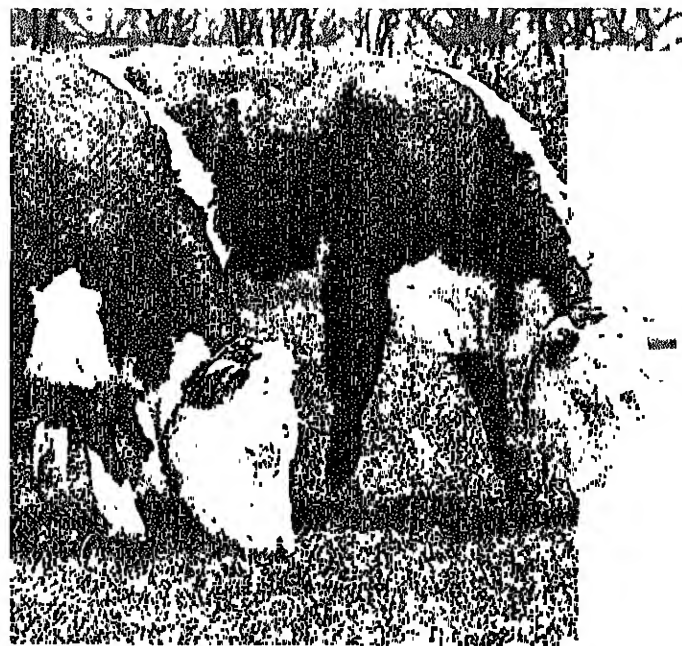
in manufacture of that commodity, producing about 312 million board feet of sawtimber a year. Nearly 29 billion board feet of hardwood sawtimber is grown in the State. From the national forest land alone, 29,483,000 board feet of timber, valued at nearly \$500,000, is cut annually.

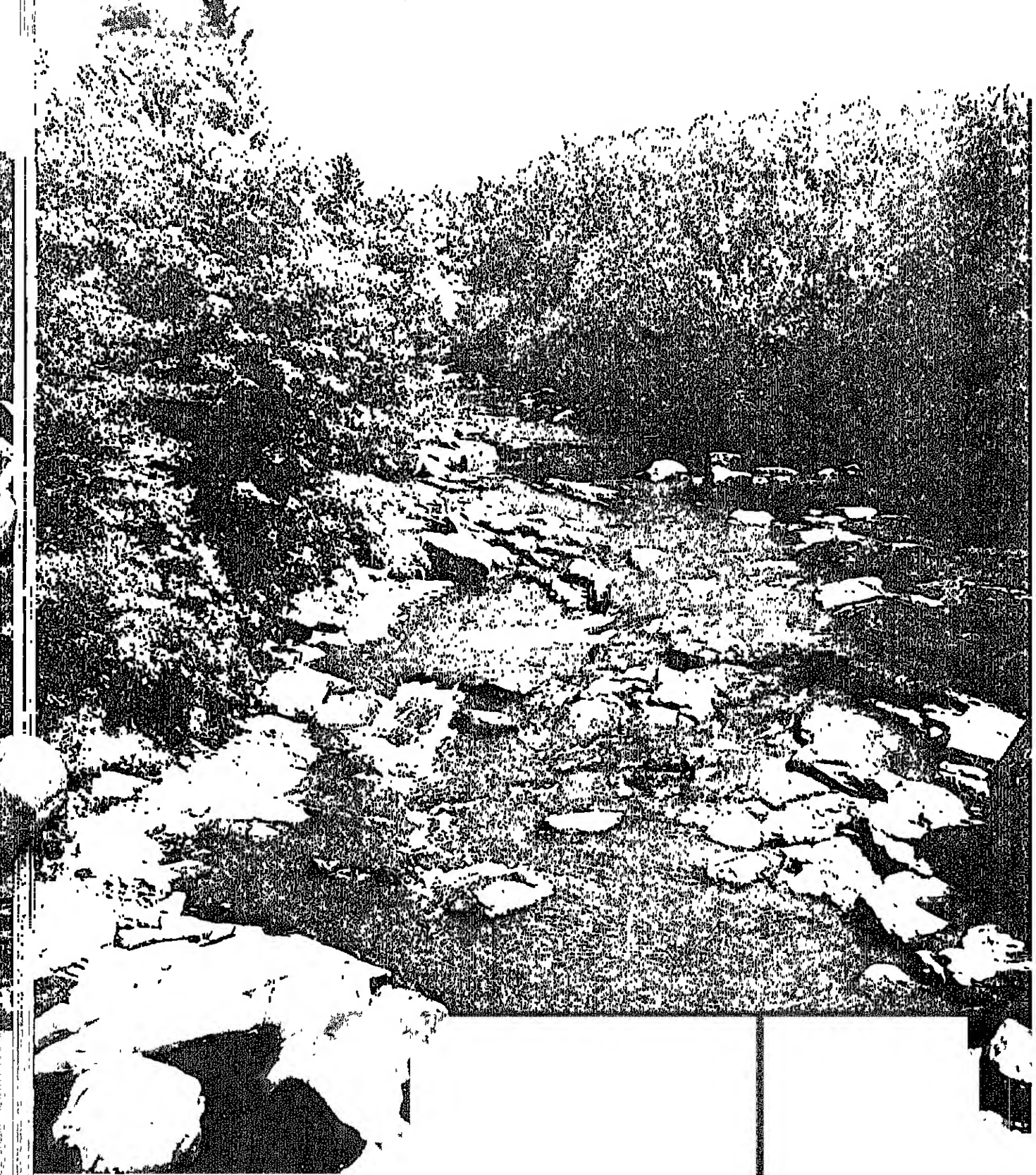
Sawlogs for lumber, timbers, and railroad ties head the list in the forest harvest. Some of the largest hardwood lumber mills in the world are in West Virginia. Mines are the State's largest consumer of forest products, using wood for props, wedges, ties, cars, housing, and other purposes. Timber is also used in the production of flooring, wood boxes, clothespins, gunstocks, furniture veneers, posts, and paper.

Forests also help protect the watersheds of rivers and streams, thereby maintaining the water resource needed for industrial and domestic consumption, and are important factors in the State's growing recreation and tourist industry.

Protecting the forests from fire and grazing damage is the chief problem in keeping West Virginia's forests productive. Other timber losses are due to insects and disease and other natural causes. Among the programs for forest protection are tree planting and tree farms.

West Virginia produces large numbers of quality beef cattle, figuring importantly in its economy.





Water Resources

From earliest times, West Virginia has been fortunate in having abundant water resources. The rivers which provided trade and travel routes for the pioneers are now utilized to meet the State's modern water needs, including industrial uses, transportation, hydroelectric power production, public water supplies, and recreation.

The major rivers of the State are the Ohio, the Kanawha, the Little Kanawha, the Guyandot, the Big Sandy, the Monongahela, the Tygart, the Cheat, the Greenbrier, the Potomac, and the Shenandoah, each having a mean annual flow of 500 cubic feet per second or more. Three of these—the Monongahela, the Kanawha, and the Little Kanawha—are still used for navigation today. In earlier days steamboat travel on the Ohio River along the State's western boundary was a major factor in West

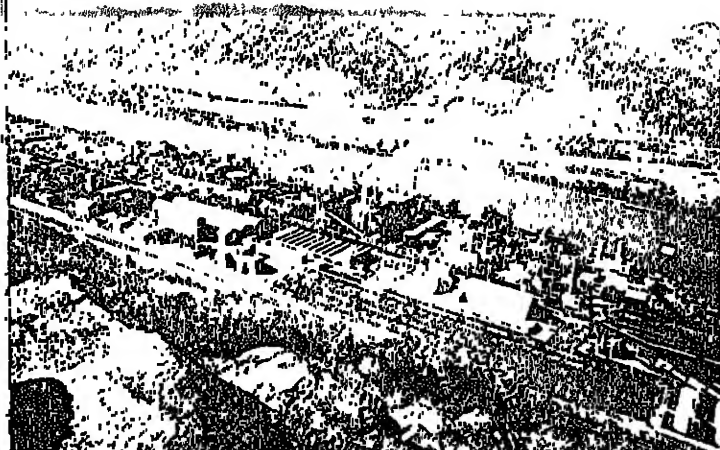
Virginia's settlement and growth. The famous river steamboat, the *Washington*, was built at Wheeling, in 1817, by Captain Henry Shreve. After service in West Virginia, the *Washington* was later used on the Mississippi River.

Precipitation

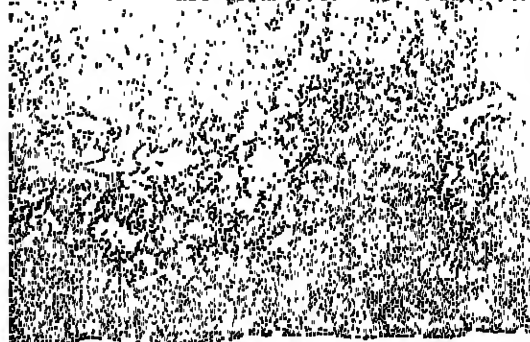
The average annual precipitation feeding West Virginia's rivers is estimated at 43 to 45 inches per year. Precipitation ranges from as much as 60 inches a year in the highest parts of the Appalachian Plateau near the center of the State to as little as 15 inches along its western boundary.

The Appalachian Mountain chain divides the State into two principal drainage areas. A small area in the east drains to the Atlantic Ocean through the Potomac and James Rivers, while a much larger part of West Virginia—roughly 85 percent of the State—lies west of the divide and drains into the Ohio River. The two drainages total an average annual runoff of about 19 inches per year, or 22 billion gallons a day.

Water resources contribute greatly to West Virginia's progress. An important river, the Blackwater flows through Blackwater Falls State Park near Davis.



Adequate water supplies have been responsible for the growth of industries in West Virginia.

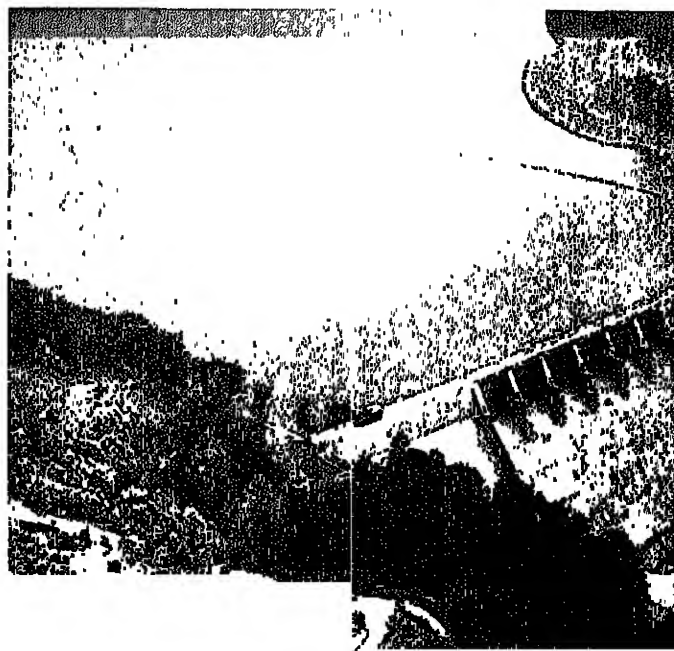


Cheat Lake, near Morgantown, gives speedboat enthusiasts an opportunity to test their craft.

(Below) Boating facilities as well as water storage are benefits of Bluestone Reservoir near Hinton.



Sutton Dam on the Elk River is part of the flood-control plan in the Ohio River Basin. Over 1,000 feet long, the dam forms a reservoir to control run-off from an area of more than 500 square miles.



With an ample surface supply, water use in West Virginia is substantial. The withdrawal use of fresh water, mostly from streams, was over 6 billion gallons per day in a recent year.

Water Pollution Fought

The State's chief water problem has been stream pollution. Preventive measures are directed by the Division of Water Resources of the State Department of Natural Resources, and most of the larger cities now have pollution-abatement programs underway. Municipal and industrial wastes, along with drainage from mines, are the principal sources of pollution, although pollution from oil wells is a problem in several counties. Efforts to control municipal wastes have been aided considerably through Federal grants-in-aid. Some of the industrial wastes are difficult and expensive to treat, making progress both slow and costly.

Ground Water

Although statistics for a recent year showed that ground water accounted for only about 3 percent of the total withdrawal use of water in West Virginia, its importance in the State is much greater than this low proportion indicates. Ground water supplies nearly three-fourths of the approximately 500 public water-supply systems, and 450,000 of the 1,250,000

persons served by those systems. In addition, it satisfies the domestic requirements of nearly all the rest of the State's population. Although most of the larger cities obtain their water from rivers, drinking water for more than a million people comes from wells and springs.

The State's most productive major aquifer, or water-bearing formation, is the alluvium along the Ohio River, made up of sediments largely deposited by glacial outwash. In some places these sediments are several miles wide and more than 100 feet thick. Wells and caissons are sunk into the sand and gravel of the alluvium. Slotted pipes extending from them radially collect water, sometimes as much as 3,000 gallons per minute, from the saturated stratum. Parkersburg, at the confluence of the Little Kanawha and Ohio Rivers, obtains its public water supply from such collectors.

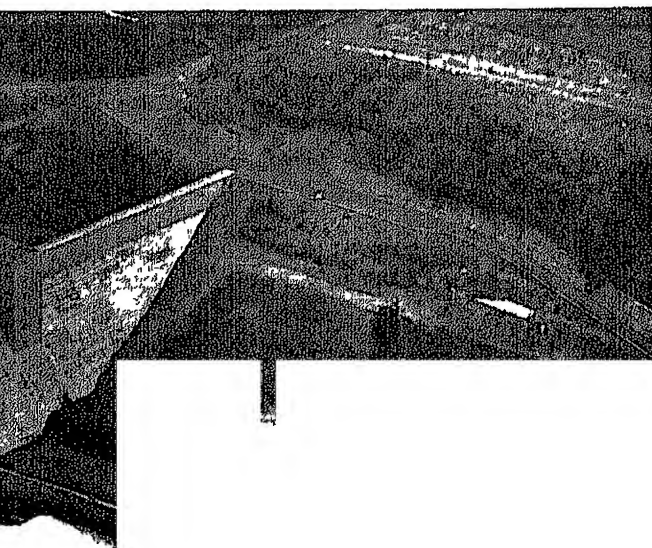
West Virginia is well supplied with springs. There are more than 200 in the State with an estimated minimum yield of 100 gallons per minute or more. Big Spring, near Masonville in Grant County, has yielded as much as 269,000 gallons per minute.

With only a little more than 50 irrigation projects, West Virginia uses an estimated 1.1 million gallons of surface water and 60,000 gallons of ground water daily for irrigation. As the advantages of supplemental irrigation are realized, the practice is expected to increase.

Power Resources

West Virginia depends on thermal electric power for most of its needs, but the State has a great undeveloped potential in hydroelectricity. Engineers estimate that the energy from falling water is capable of producing 2,300,000 kilowatts. Thus far, less than 10 percent of that energy, or about 208,000 kilowatts, has been harnessed. Electric power generated by both public and privately owned steam plants is estimated at 3,152,000 kilowatts.

The only hydroelectric storage project of any size in West Virginia is Lake Lynn on the Cheat River, built by Western Pennsylvania Power Co. Many small hydroelectric plants operate on the "as is" flow of the State's several rivers.





Rock layering typical of West Virginia is pictured in Summers County. Mud, sand, and gravel deposits formed the rocks.

Geologic History

Almost all the rocks of West Virginia are sedimentary ones that were deposited originally as nearly flat-lying beds of gravel, sand, clay, plant and animal remains, lime, and other chemically precipitated mineral matter. They accumulated slowly, through long ages, in a subsiding basin, were consolidated and subjected to great compressive stresses, and were raised high above sea level.

Subsequently, rivers carved deeply into these layers, exposing to view earth layers that represent about 300 million years of the world's history. The dissected topography of hills, ridges, canyons, and narrow valleys carved in these sedimentary rocks makes West Virginia a region of great scenic beauty. Many layers in the West Virginia hills consist wholly or in part of nonmetalliferous materials, such as coal, limestone, or salt, that are basic to the State's economy.

West Virginia can be broadly divided into two physiographic provinces. About four-fifths of the State is in the Allegheny Plateau.

The Allegheny Plateau is one of a group of highlands underlain by flat-lying sedimentary rocks that make up the Appalachian Plateaus, the unfolded Appalachian Mountains. Rock strata are flat lying or have been folded in broad, open folds.

The stream pattern is irregularly branching in all directions. In the West Virginia part of the Allegheny Plateau, relief is generally moderate to strong, valleys are narrow and deep, and little flat land is left along the ridge tops. Most of the country is in hillsides. Alternate layers of hard and soft rocks respond unequally to erosion, so that as streams cut down through the horizontal strata, the resistant layers stand out as steep cliffs that are separated by gentle slopes formed on soft rock.

The other physiographic province, the Ridge and Valley province, extends through the eastern tier of counties as a northeast-trending belt. It is part of the folded Appalachian Mountains. Here topography consists of linear ridges with paralleling valleys. The ridges are long and northeast trending; their summits are mostly accordant in height. The valleys are wide white wide belts of limestone, shale, and other easily eroded rocks crop out at the surface, and are narrower elsewhere.

Major streams and rivers flow on the easily eroded rocks in the valleys and rarely break through the resistant rocks that form the ridges. Tributary streams descend from the ridges, entering the trunk streams at right angles. The stream pattern so formed is called trellised drainage.

A résumé of geologic history explains why the Allegheny Plateau and the Ridge and Valley province differ so greatly in appearance.

The oldest rocks now exposed in West Virginia were deposited in the sea more than 500 million years ago. Deposition of sediments continued slowly for about 300 million years, the character of the sediments varying from place to place and from time to time. A thick sequence of flat to gently dipping limestone, shale, and sandstone accumulated during earlier stages of this history, largely in a shallow sea. During later stages the depositional environments varied considerably. At times sand ac-

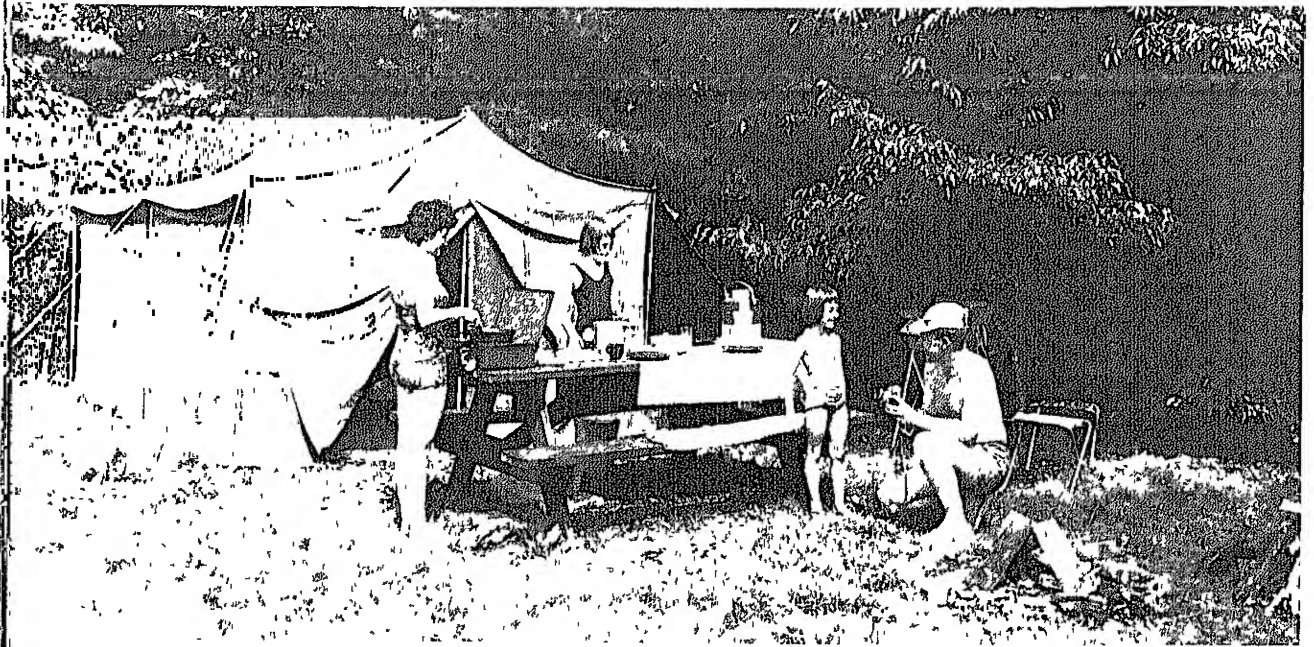
cumulated as beaches and bars along the seashore, whereas at other times salt was deposited in a restricted sea. About 250 million years ago, huge swamps covered much of the State, and the great coal deposits of West Virginia accumulated as organic debris trapped in these swamps.

Near the close of the time of deposition, while the coal-bearing rocks were accumulating, the area east and southeast of West Virginia was deformed and uplifted into a major belt of mountains. West Virginia's eastern tier of counties was buckled and broken in the later stages of the mountain building.

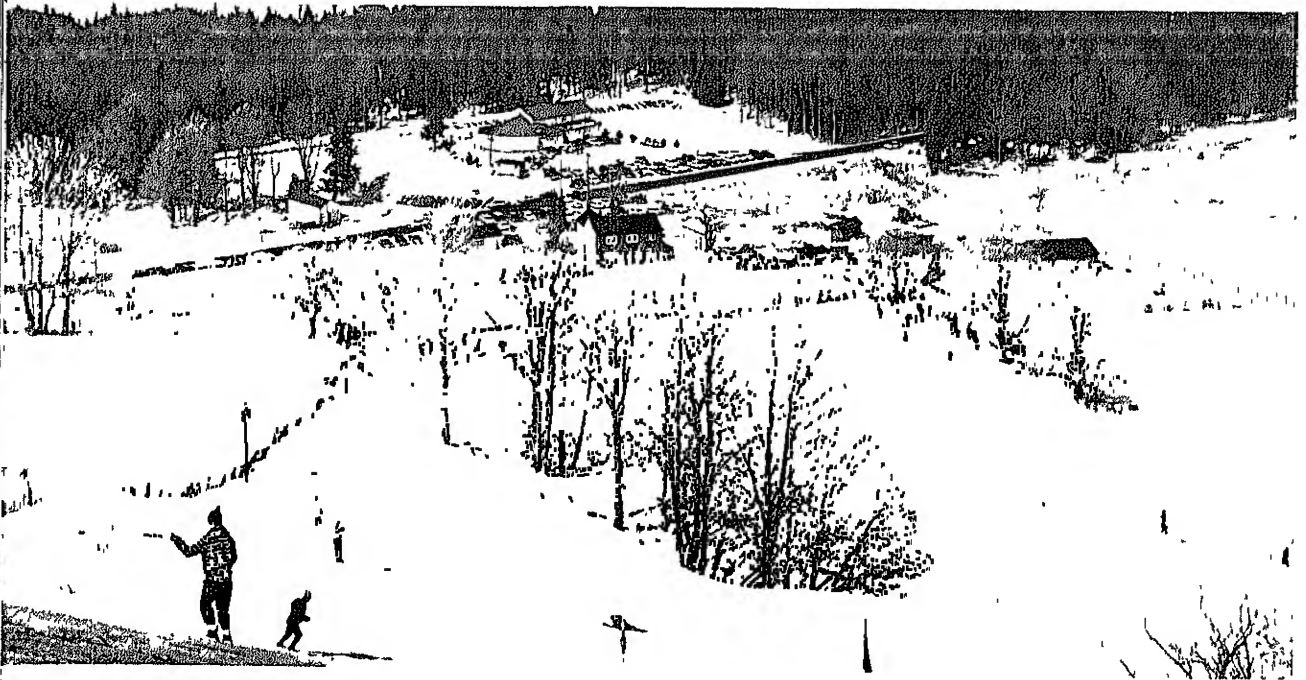
The youngest sedimentary rocks in West Virginia, other than recently accumulated unconsolidated river alluvium, were deposited about 200 million years ago. Since then, West Virginia has been consistently elevated above sea level. The rocks that now constitute the Allegheny Plateau were never subjected to mountain-building movements as were the strata in the Ridge and Valley province. Through topographically mountainous, this province is an uplifted and dissected plain.

During much of the succeeding 200 million years West Virginia has been undergoing erosion. Several times the region has been worn down almost to a featureless plain, then broadly uplifted and reeroded. The linear features of the Ridge and Valley province are carved in tilted strata of unequal hardness, once deeply buried and now exhumed. The harder rocks form the rugged mountains that stand boldly above level river valleys formed in the softer rocks.

The flat-lying sedimentary rocks of the Allegheny Plateau have been eroded more uniformly because the harder layers protected the softer ones. Possibly younger rocks once overlay the layers now forming the tops of the ridges and have since been carried away. With this exception, however, the flat-lying to gently dipping strata preserve, essentially intact, the complete sequence of strata originally deposited. The deep canyons worn into them by streams enable us to observe these layers, one above another, and to decipher the geological history of the State.



Park and Recreational Resources



West Virginia is the recreation area many people in the eastern half of the United States are seeking. With a strong rural flavor, the State lies between the giant industrial areas to its east and west and presents a pleasant contrast to much of the Mississippi Valley.

Its mountains impart serenity and restfulness and its fish and game provide inviting opportunities for sportsmen. National forests alone offer nearly 1 million acres for hunting and fishing.

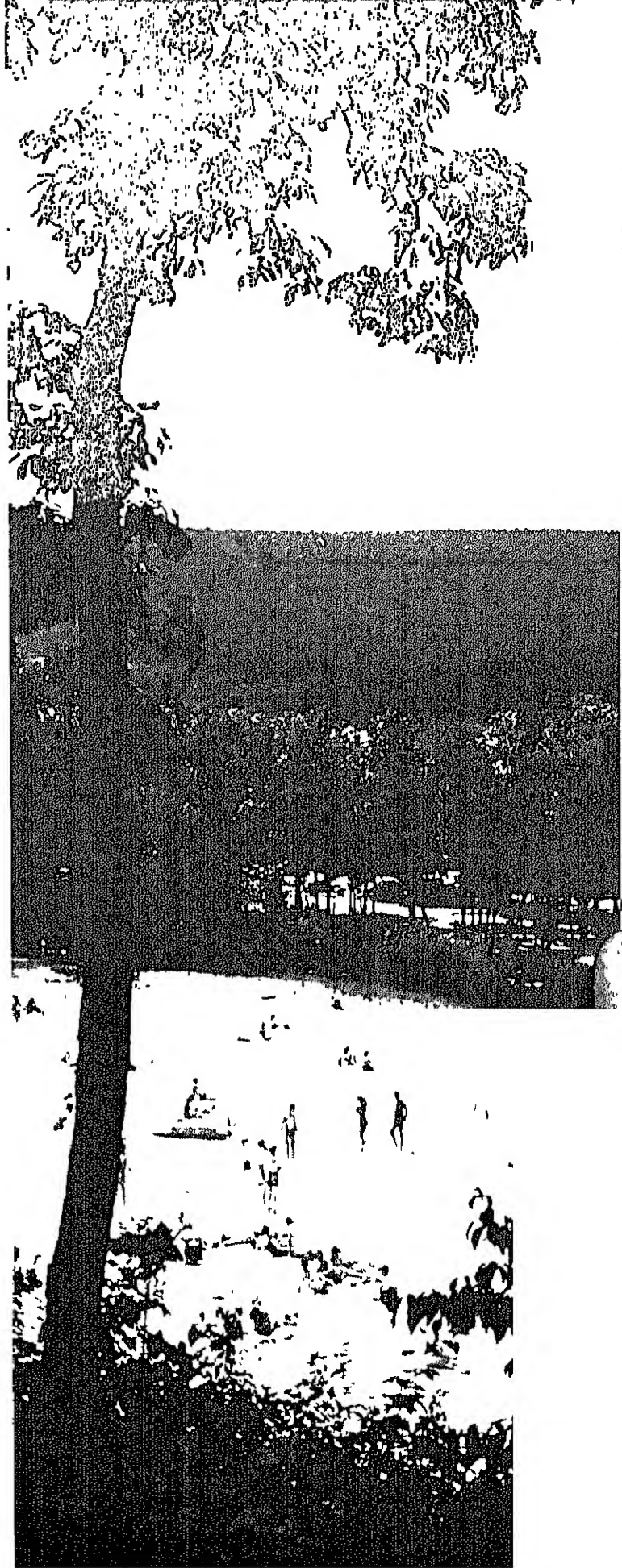
In addition to the squirrels, raccoons, and grouse which provide traditional sport for the local hunters, the visitor finds deer, bear—the State animal—and even wild turkey.

The rugged terrain of West Virginia immediately brings to mind the mountain stream with its challenge to the trout fisherman. Better known locally, however, is the spectacular fishing for walleyed pike, small- and large-mouth bass, catfish, and several kinds of panfish. The seclusion of good streams is a feature West Virginia offers in many parts of the State. The State has over 800 miles of trout waters and 18,000 miles of warm-water fishing. The total area of fishing waters is approximately 100,000 acres of which 3,200 are trout waters.

The relative scarcity of commercial lodgings for hunters, fishermen, and touring recreationists has prompted the State's Department of Natural Resources to develop such facilities in the State parks and forests. There are about 30 such areas in the State, and about half of them have excellent lodging and food facilities available.

Information tables listing major Federal, State, and local recreation areas in West Virginia and a location map appear at the end of this chapter. The acreage, type of visitor use, and outdoor activities available at the various parks, forests and recreation sites can be found by reading across the table. The areas can be located on the map of West Virginia by matching the key number on the tables to the corresponding number on the map.

West Virginia offers a wide range of recreation opportunities. Monongahela National Forest (upper left) provides excellent camping grounds. Skiing is popular in the mountains and (right) swimmers enjoy the large lake beach at Cacapon State Park.



Most hunters and fishermen in West Virginia now use trailers and tents which they set up in convenient locations, instead of lodging in the homes of local residents, once a universal practice.

National Forests

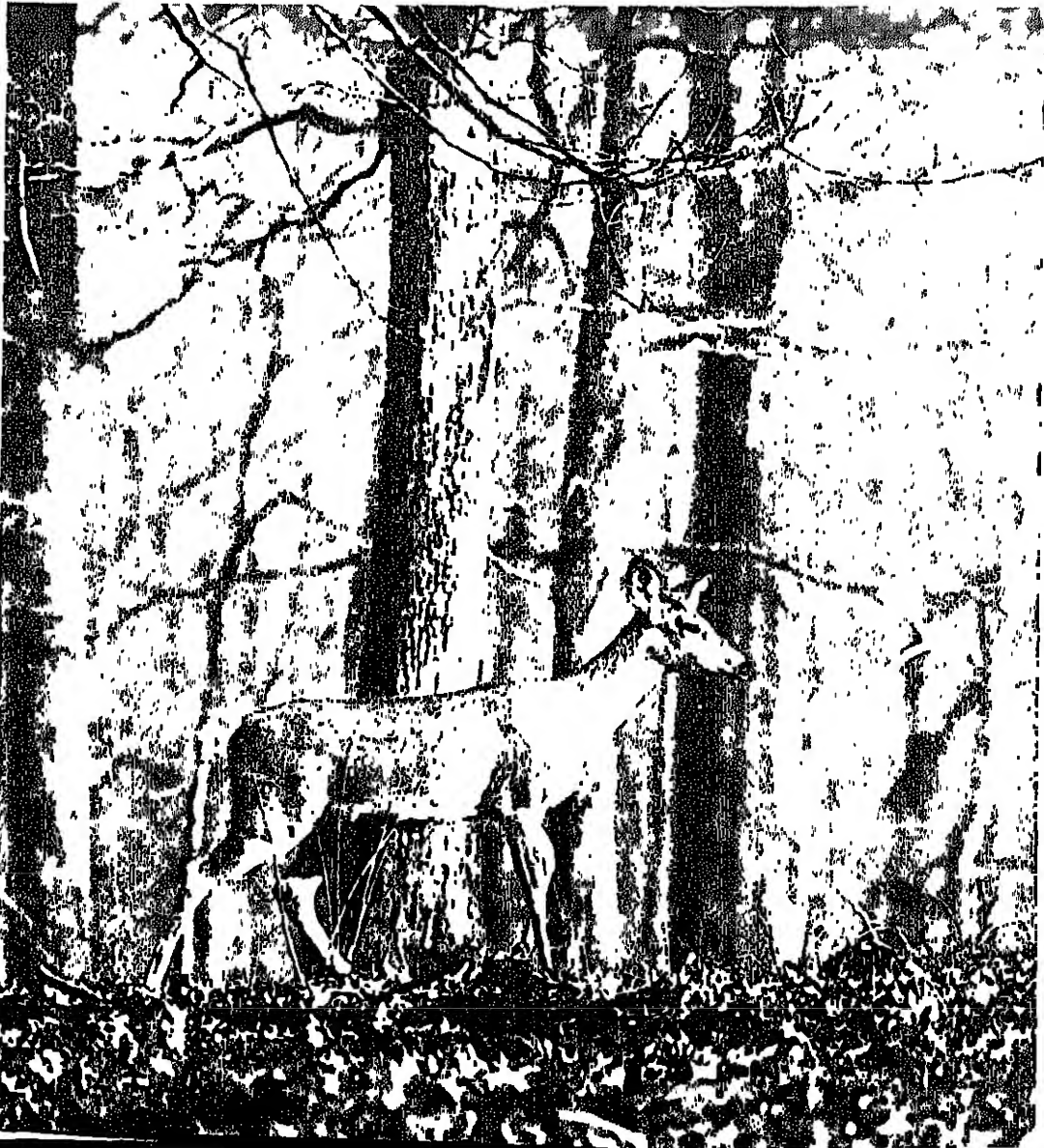
The National Forest Service areas within West Virginia offer a wide variety of recreation opportunities which include hiking, camping, picnicking, hunting, fishing, boating, swimming, and other activities.

Within the West Virginia portion of the George Washington National Forest and in the Monongahela National Forest are 51 campgrounds, 13 picnic sites, 4 organization camps, 4 swimming areas, and 2 boating areas. The

Monongahela National Forest contains many features of interest to visitors. These include Spruce Knob, highest point in the State (4,860-foot elevation), natural caverns, scenic river gorges, and Cranberry Glades which, with its combination of wild cranberries, wild orchids, and tundra, is of unusual interest to naturalists.

Future Potential for Recreation

The State has no natural lakes but has built a few artificial lakes. More of these are in prospect and they will provide much additional fishing as well as help to stabilize stream flows, thus giving them better fishing potential. Additional steps have been taken to lead to the abatement of mine wastes and other pollutants. When the streams are cleaner, fishing oppor-



tunities will be greatly increased even without special development measures. Still greater opportunities for hunting and fishing are in store for West Virginia when fish and wildlife conservation and development features are incorporated in the future flood control and water-use project on pollution-free streams.

While not as populous as some of its neighboring States, West Virginia has a great potential in recreational development because it is convenient to areas of high population density and because it offers a wide range of scenic and other outdoor attractions, including hunting and fishing. Although access to many sections by common carrier is limited, most of the back country can be reached by automobile.

As a member State in the 10-State Appalachian region, West Virginia's future was studied in 1963 by the President's Appalachian Regional Commission. One of that organization's recommendations was that West Virginia, along with companion States of Appalachia, receive an additional 2,150 miles of intercity highways and hundreds of miles of short access routes to facilities, such as recreation sites and industrial areas.

Planners who have studied West Virginia visualize increased tourism with the construction of more primary highways, secondary

roads, trails, and additional parking areas at its many scenic spots. The famous Appalachian Trail touches the State only along the Virginia boundary for about 15 miles south of Harpers Ferry.

West Virginia's parks, far more numerous than in many States, rank high in appeal and are the scene of about 2 million visits a year. In addition, West Virginia has 100 municipal and county parks, averaging about 40 acres each.

National Parks

The National Park Service administers Harpers Ferry National Historical Park located at the confluence of the Shenandoah and Potomac Rivers in the Blue Ridge Mountains. This scenic area, with a gross acreage of 1,500 acres, is the site of important events of colonial times and the famed John Brown raid. Strategically important, Harpers Ferry changed hands many times during the Civil War.

In addition to administering Harpers Ferry National Historical Park, the National Park Service has prepared a Preliminary Plan for the Recreation Resource Development for West Virginia.

The Department of the Interior is also cooperating with the Corps of Engineers in a

(Left) Deer in the thousands roam the forests and mountains of West Virginia. Deer hunting is a major sport in the State.

(Right) The State's rivers mean fishing for some, canoeing for others. Bass is a favorite catch on the Potomac shown here.





comprehensive study of the Potomac River basin, 3,490 square miles of which lie within West Virginia. The National Park Service is supplying information on recreation resources, evaluating the recreation aspects of Corps project areas, and cooperating with the Corps in developing recreation plans for the areas.

State Programs

A State development program for parks, using emergency employment labor, has been underway several years for the purpose of repairing old facilities and building new ones. This includes the construction of swimming pools, paving of park roads, building trails, the addition of new camping areas in four State parks and camping in three areas where camping previously was not furnished, and the reconditioning of all vacation cabins.

In 1955 and 1956 a \$4,200,000 revenue bond program was instituted for developing facilities in Audra, Blackwater Falls, Bluestone, Cacapon, Mont Chateau, Lost River, Tygart Lake, and Watoga State Parks. Under this program, 4 lodges, 88 cabins, improvements to swimming areas, and other facilities were constructed. To retire these bonds, the State has pledged the revenues from all facilities from the parks where developments were made, including revenues from facilities that were constructed prior to the time of the revenue bond program.

One development in Grandview State Park merits special mention. This is the construction of an amphitheater, completed in June 1961, for the purpose of producing an outdoor play entitled "Honey in the Rock" that portrays the founding of West Virginia. This is produced by the West Virginia Historical Drama Association and will run for 10 weeks each summer.

State parks, forests, recreation areas, and historic monuments encompassing 122,000 acres offer such recreational opportunities as hiking,

fishing, swimming, hunting, winter sports, camping, and boating.

Watoga State Park, largest of the 19 State parks, includes more than 10,000 acres. Holly River State Park is next in size with over 7,500 acres, and Cacapon State Park with more than 5,800 acres is third.

The historic monuments in West Virginia range in size from the 1-acre Morgan-Morgan Monument to the 270-acre Droop Mountain Battlefield State Park.

Nine State forests provide attractive recreational areas. The largest is Cooper's Rock State Forest with more than 13,000 acres; Seneca State Forest and Calvin W. Price State Forest have areas in excess of 10,000 acres.

West Virginia's recreation resources are so attractive that if properly preserved and developed they will serve not only the population of West Virginia, but also many millions of persons from adjacent States. Seven additional State park areas are listed for consideration, a State recreation area system is recommended, and the expansion of out-of-city park systems and programs is encouraged.

In summary, West Virginia possesses a combination of natural resources and recreational potentials unique in all of the United States east of the Mississippi. These resources can attract many millions of visitors from other States and can help develop the outstanding recreational resources of West Virginia.

Corps of Engineers Recreation Areas

Water-based recreational opportunities have also been developed in West Virginia by the U.S. Army Corps of Engineers in conjunction with its flood control, navigation, and water conservation programs.

Four areas—with a total shoreline of 285 miles—attract over 850,000 people annually with boating, fishing, swimming, picnicking, and camping facilities available. The areas are—

The Bluestone Reservoir on the New River.

The Kanawha River Locks and Dams.

The Sutton Reservoir on the Elk River.

The Tygart River Reservoir.

An informational brochure on these projects

(Left) Black bear find an excellent habitat in the more rugged sections of the Mountain State.



Young outdoorsmen explore a mountain path. Many miles of trails in the State make hiking popular

Racoons are among the small game animals which provide sport for local hunters in West Virginia.



and further information concerning the principal recreation features of the reservoirs can be obtained by writing the U.S. Army Engineer Division, Ohio River, Cincinnati, Ohio.

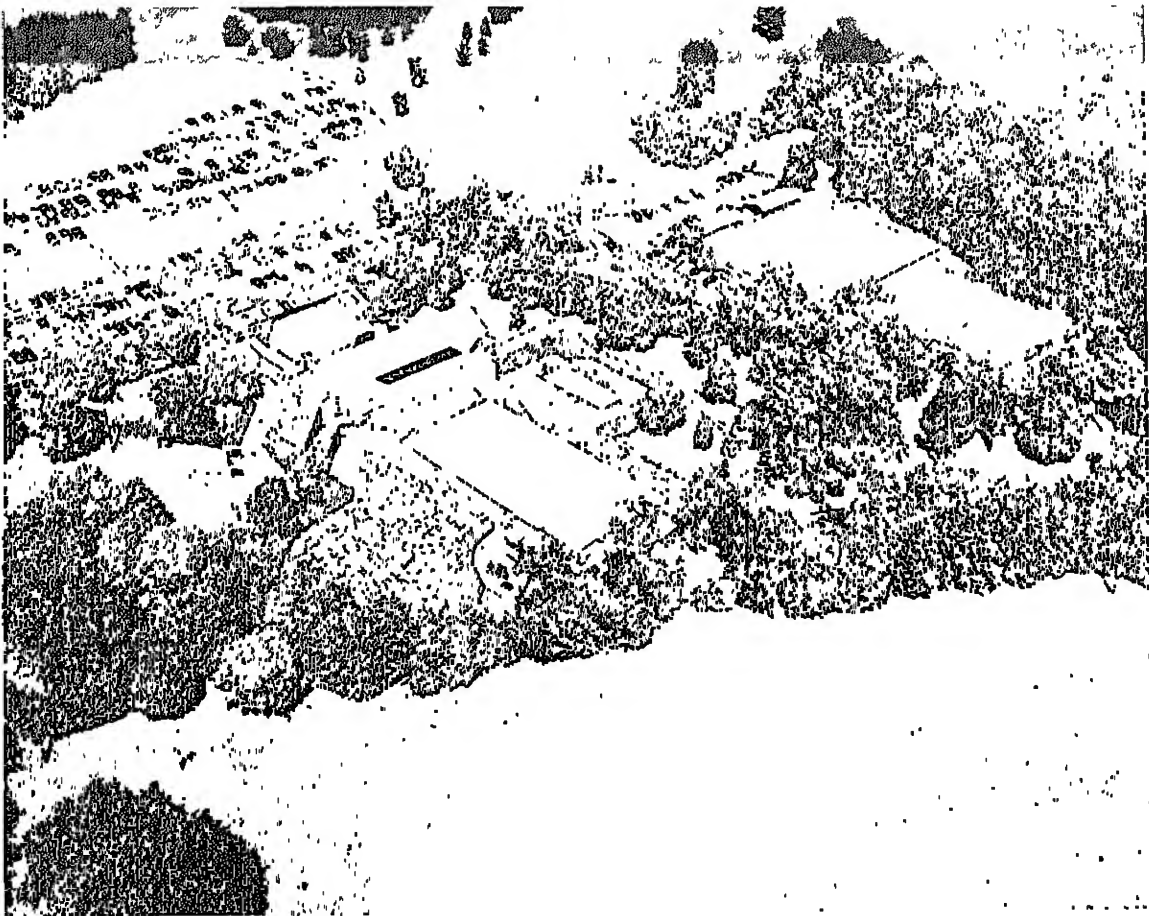
Privately Owned Recreation Facilities

Privately owned recreation facilities are of major importance in West Virginia. These range from resident summer camps for boys and girls to fine hunting areas. The State's crop and pasture lands contribute significantly to the supply of outdoor recreation opportunities. Many vacation farms accept tourists as resident guests. Others lease or supply hunting opportunities, often in combination with cabin

facilities. Camping, picnicking, fishing, hiking, horseback riding, and guide services are provided by some. Many lease or sell scenic sites for home and camp lots.

Lists of all the privately operated recreation opportunities in West Virginia are not available from any single source. Travel bureaus and agencies and commercial organizations such as gasoline companies, motel and hotel associations, airlines, railroads, local Chambers of Commerce, and outdoor clubs and organizations all can supply information on many of the privately owned facilities. Local inquiry will reveal others. Information is available from the Division of Parks and Recreation, State Office Building, Charleston, W. Va.

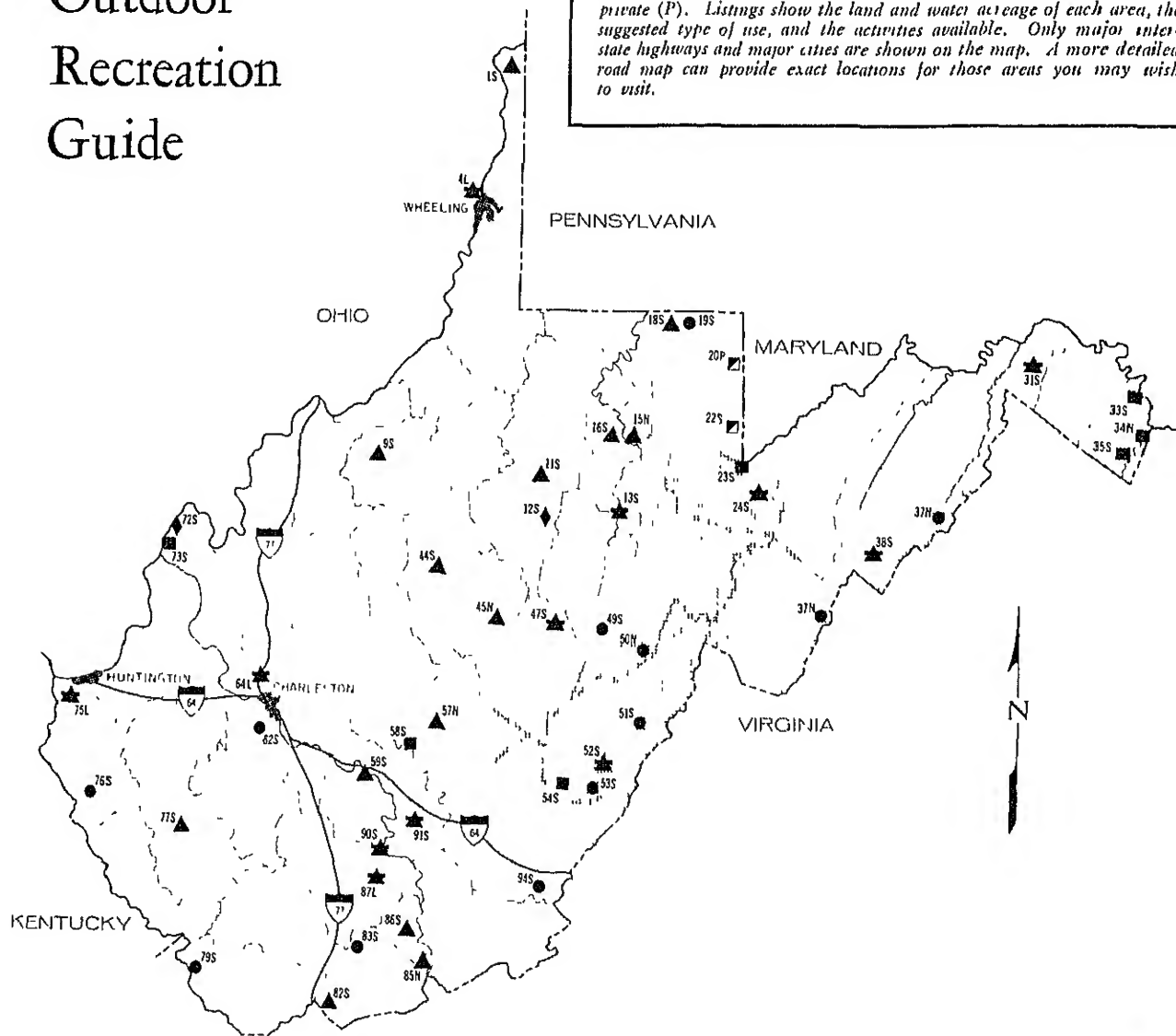
In the hills of Wheeling, W. Va., internationally-famous Oglebay municipal park covers more than 1,000 acres and offers such recreation as golf, tennis, swimming, and horseback riding enjoyed by thousands of visitors each year.



West Virginia Outdoor Recreation Guide

HOW TO USE THIS GUIDE

Symbols on the map below represent major areas in West Virginia offering recreation. Areas described in the listings on the following pages may be located on the map by matching the key numbers (as 15N) with the numbers beside symbols on the map. Letters in the key number refer to federal (N), State (S), local (L), and quasi-public and private (P). Listings show the land and water acreage of each area, the suggested type of use, and the activities available. Only major interstate highways and major cities are shown on the map. A more detailed road map can provide exact locations for those areas you may wish to visit.




- Park ★
- Recreation Area, Etc. ▲
- Monument ■
- Nature Preserve ◻
- Wildlife Area ◆
- Forest ●


NATIONAL FOREST





	Number on map	Acreage		Type of use				Activities										
		Total land and water within area	Water surface (%)	Day and weekend Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience		
FEDERAL																		
Recreation areas:																		
Tygart Reservoir	15N	1,700	x		x	x				x		x						
Sutton Reservoir	45N	M	x		x	x				x		x						
Summersville Reservoir	57N	M	x		x	x				x		x						
Bluestone Reservoir	85N	1,900	x		x	x				x		x						
Park—Historic: Harpers Ferry National Historical Park	34N	469	x	x	x			x										
Forests:																		
Monongahela National Forest	50N	805,721	S	x			x	x	x		x	x	x					
George Washington National Forest (West Virginia portion)	37N	98,259	x				x	x				x	x					
STATE																		
Parks:																		
Audra State Park	13S	306	x				x	x			x	x						
Blackwater Falls State Park	24S	1,679		x	x	x		x	x	x	x	x	x					
Cacapon State Park	31S	5,814	6	x	x	x		x	x	x	x	x	x					
Lost River State Park	38S	3,610		x	x	x		x	x		x							
Holly River State Park	47S	7,592		x	x			x	x	x		x	x		x			
Watoga State Park	52S	10,057		x	x	x		x	x	x	x	x	x		x			
Grandview State Park	90S	878		x				x	x									
Babcock State Park	91S	3,227		x	x			x	x	x		x	x					
Recreation areas:																		
Tomlinson Run State Park	1S	1,387	27	x	x			x	x		x	x	x					
North Bend State Park	9S	1,420		x				x	x	x		x						
Watters Smith Memorial State Park	11S	270		x				x										
Tygart Lake State Park	16S	1,803	1,700	x	x			x	x	x	x	x	x					
Mont Chateau State Park	18S	42	M	x	x	x	x		x		x	x	x					
Cedar Creek State Park	44S	2,000		x				x					x					
Hawk's Nest State Park	59S	94		x		x	x	x	x									
Chief Logan State Recreation Area	77S	2,471		x				x	x	x								
Pinnacle Rock State Park	82S	33		x			x	x	x									
Bluestone Reservoir State Park	86S	211	1,900	x	x			x		x	x	x	x					
Monuments: Historic:																		
Fairfax Stone Historical Monument	23S	4		x		x												
Rumsey Memorial Monument	33S	2		x		x												
Morgan-Morgan Monument	35S	1		x														
Drum Mountain Battlefield State Park	54S	269		x				x	x									
Carnifex Ferry Battlefield	58S	156		x				x	x									
Point Pleasant Battle Monument	73S	6		x														
Nature preserve: Cathedral State Park	22S	126		x		x	x	x										
Wildlife areas:																		
Horner Game Refuge	12S	189		x									x	x	x			
Clifton F. McClintic Wildlife Station	72S	50	5	x									x	x	x			
Forests:																		
Cooper's Rock State Forest	19S	13,479		x				x	x	x				x				
Kumbrabow State Forest	49S	9,425		x	x			x	x				x	x				
Seneca State Forest	51S	11,492	4	x	x			x	x		x	x	x	x				
Calvin W. Price State Forest	53S	10,776		x										x				
Kanawha State Forest	62S	6,705																
Cabwaylingo State Forest	76S	8,126		x	x			x	x			x	x	x				
Panther Creek State Forest	79S	7,724		x				x	x			x		x				

See footnotes at end of table.

	Number on map	Acreage		Type of use				Activities										
		Total land and water within area	Water surface (7)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience	
Forests—Continued																		
Camp Creek State Forest	83S	5,578	x .				x x						x				
Greenbrier State Forest.	94S	5,004	x x				x x				x					..	
MAJOR LOCAL																		
Parks:																		
Oglebay Park.	4L	1,050	S	x x x				x x			x	x	x		x x			
Coonskin Park.. . . .	64L	1,000	x				x x										
Camp Mad Anthony Wayne Park	75L	311	x x				x x			x				x		..	
Little Beaver Park.	87L	437	50	x				x			x							
MAJOR QUASI-PUBLIC AND PRIVATE																		
Nature preserve, Cranesville Swamp.	20P	256	x				x							x		..	

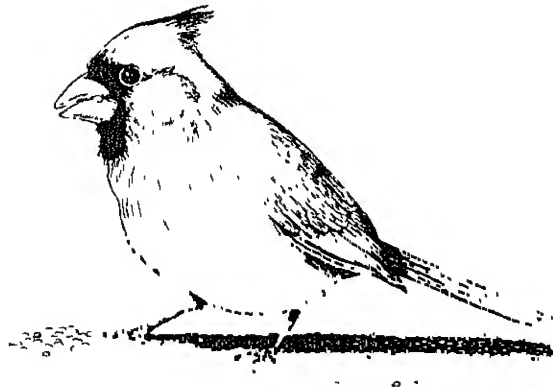
Footnotes—

- (1) Where water surface acreage not shown:
 "S" indicates water area under 500 acres.
 "M" indicates water area of 500 to 10,000 acres.

Blue Bend Recreation Area in Monongahela National Forest provides excellent opportunity for swimming and fishing

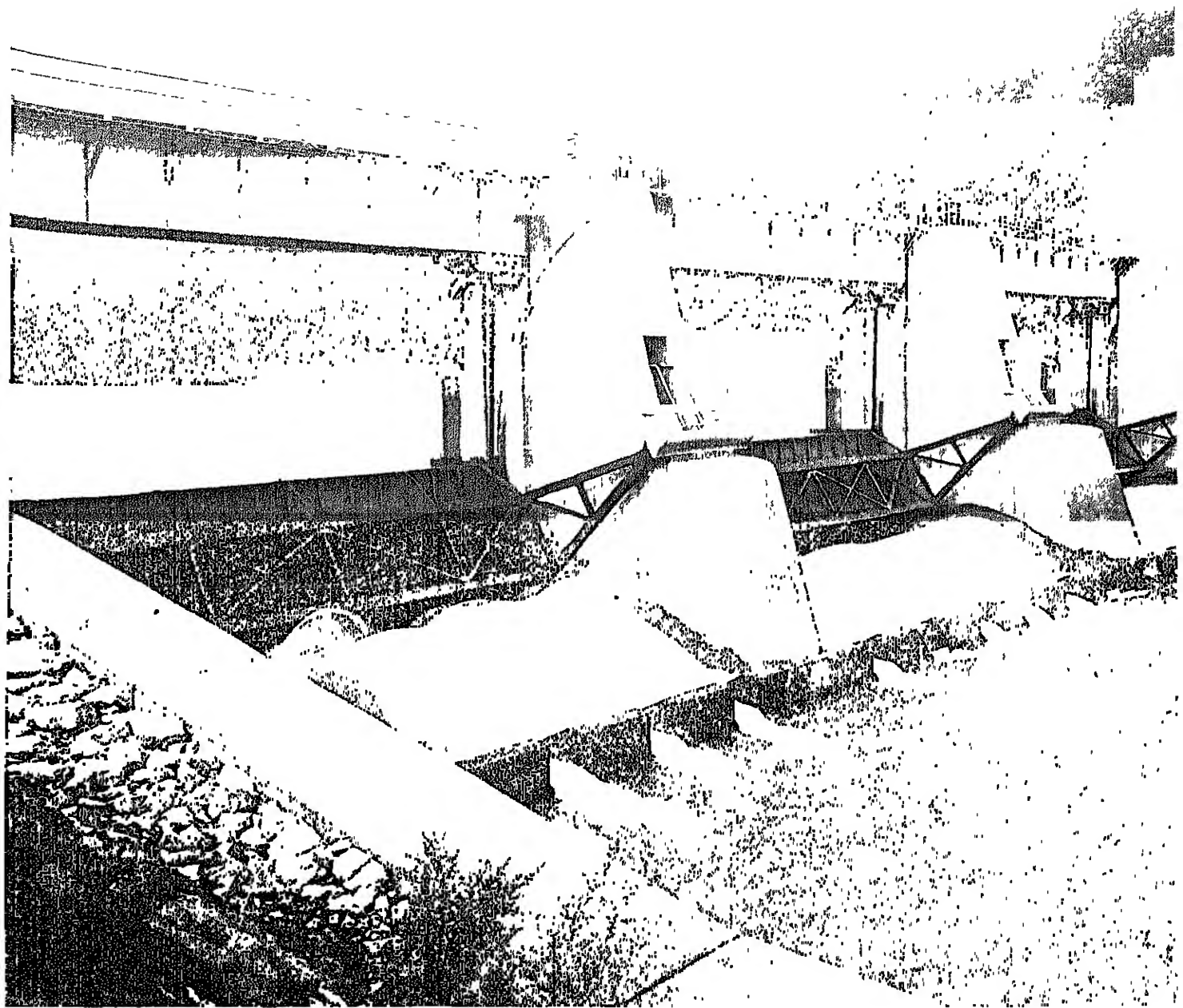


Programs of Federal Natural Resource Agencies

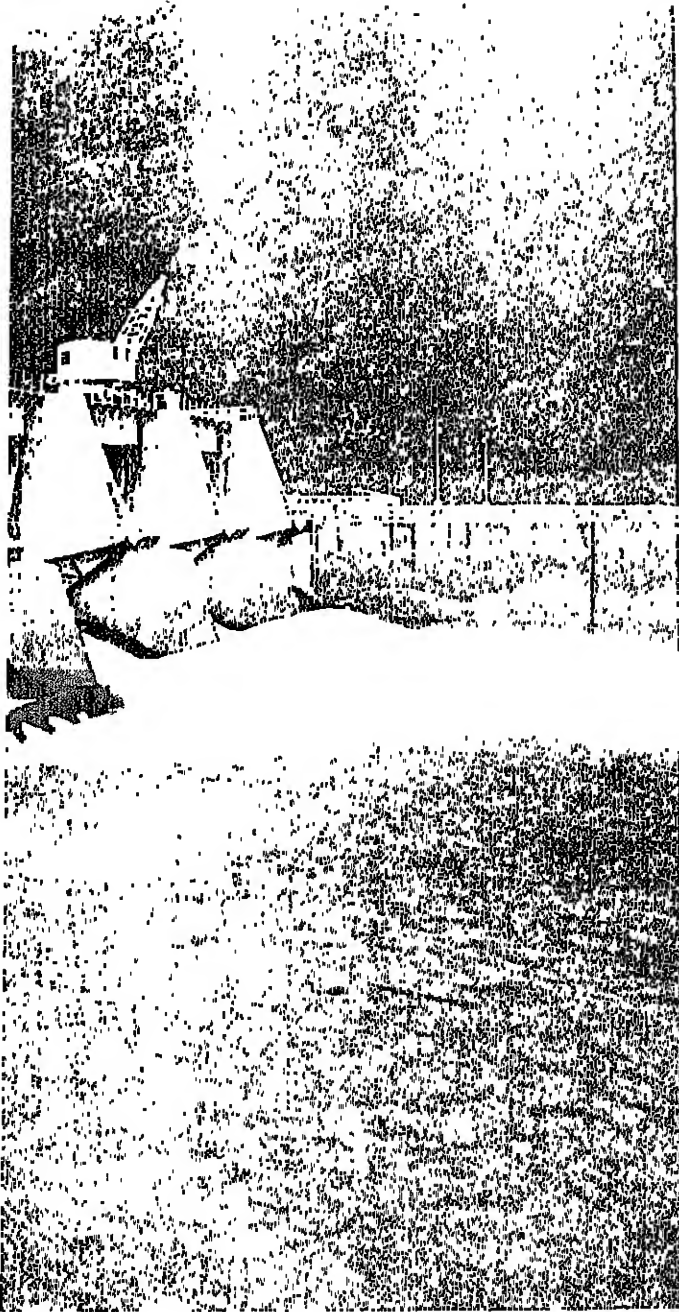


State bird—Cardinal

The State of West Virginia is rich in a wide range of natural resources. The wise use and protection of such endowments long have been the concern of natural resource agencies of the Federal Government. The following pages describe some of these programs and interests.



U.S. Army Corps of Engineers

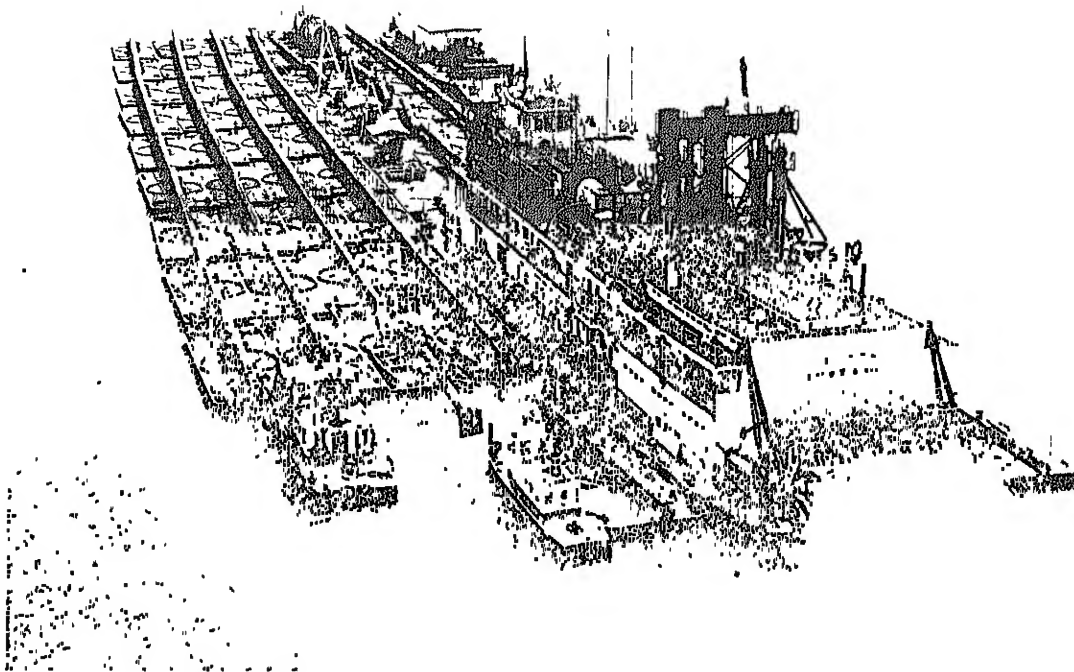


U.S. Army Corps of Engineers' Morgantown lock and dam facilitate navigation on the Monongahela River.

Within limits authorized by the Congress, the U.S. Army Corps of Engineers is responsible for solution of various phases of the overall water problems of West Virginia. Under direction of the Secretary of the Army, the program is supervised by the Chief of Engineers at Washington, D.C., with planning, construction, operation, and maintenance functions performed by various field offices, designated as Divisions and Districts. Principal elements in the Corps' program are flood control and navigation, but other associated water resource developments such as water supply and conservation, hydroelectric power generation, major drainage deficiencies, flow regulation, pertinent basic recreational developments, and the like are also given consideration.

About 85 percent of the stream runoff of West Virginia drains into the Ohio River. In this area is more than a third of the original system of locks and dams completed in 1929 to provide dependable year-round navigation on the Ohio River. This system of navigation structures has proven singularly successful and has enjoyed sustained growth of traffic to the point where the aging structures are inadequate for efficient service. A replacement program now is underway. Navigation facilities were also provided as a part of the Corps' program on major tributaries of the Ohio River located wholly or partially in West Virginia; namely, the Monongahela, Little Kanawha, Kanawha, and Big Sandy Rivers. Of these, the Monongahela and Kanawha improvements, like those on the Ohio, are of major commercial value, whereas the Little Kanawha and Big Sandy improvements, once of considerable commercial importance, are now inoperative and in poor condition. Modernization of the obsolete Monongahela River navigation structures in the upper reaches of the waterway is well advanced. Navigation is not a feature of the water resources development program in the Potomac River watershed portion of West Virginia.

In addition to navigation improvements, the program includes 13 reservoirs on Ohio River tributaries in West Virginia. These reservoirs are units of a comprehensive plan for flood control and other purposes in the Ohio River basin.



Pipeline dredges such as this are used by the Corps of Engineers to bring material up from the Ohio channel.

Two are completed and in operation, a third is complete for operational purposes, and a fourth is under construction. In addition to the function of temporary storage of flood runoff which is characteristic of all these reservoirs, most of them include conservation storage in varying degrees. This storage contributes to the preservation of fish and wildlife and provides for extensive use for all phases of recreational activities associated with water impoundments. Tygart Reservoir, one of the completed projects, is operated in the interest of low flow regulation as well as flood control; a measure of seasonal low flow regulation will also be provided by Sutton Reservoir.

Reservoirs have also been considered for flood control and related purposes, including the production of hydroelectric power, at sites in the Potomac basin portion of the State. To date, however, such projects have not been adopted in that area.

Since it is impracticable to control the destructiveness of flood waters in all parts of the State

by means of reservoirs, the Corps of Engineers' program in West Virginia includes protection by local works comprising levees and walls, and in a few instances channel improvements, for many communities where flood damages are concentrated. Of the 14 projects of this character in the Ohio River watershed portion of the State, 6 have been completed and 2 others are underway. In the Potomac basin portion of West Virginia one local flood protection project is completed and two are authorized.

In observing the Corps of Engineers' programs in West Virginia, one should recognize that with few exceptions these units are elements of coordinated plans in which the individual projects in West Virginia are interrelated not only with each other, but also with projects in a broad region. Thus, the program in West Virginia benefits areas in other Ohio River and Mississippi River basin States adjacent to and downstream from its Ohio River boundary. In turn, areas in West Virginia benefit from the larger basin program located upstream.

Projects in West Virginia

FLOOD CONTROL PROJECTS COMPLETED

Bluestone Reservoir
 Cetado-Kenova Local Protection Project
 Elkins Local Protection Project
 Huntington Local Protection Project
 Parkersburg Local Protection Project
 Point Pleasant Local Protection Project
 Princeton Local Protection Project
 Ridgeley, W. Va., and Cumberland, Md., Local Protection Project
 Sutton Reservoir

MULTIPLE-PURPOSE PROJECTS COMPLETED:

Tygart Reservoir

NAVIGATION PROJECTS UNDERWAY:

Upper Monongahela River Navigation Project (modernization program):

Opckiska Lock and Dam
Ohio River Navigation Project (modernization program):
 Greenup Locks and Dam
 New Cumberland Locks and Dam
 Pike Island Locks and Dam

FLOOD CONTROL PROJECTS UNDERWAY:

East Rainelle Local Protection Project
 Summersville Reservoir
 Williamson Local Protection Project

AUTHORIZED NAVIGATION PROJECT:

Belleville Locks and Dam

AUTHORIZED FLOOD CONTROL PROJECTS:

Active Authorized Flood Control Project:

Wheeling-Benwood Local Protection Project

Other Authorized Flood Control Projects:

Big Bend Reservoir
 Birch Reservoir
 Buinsville Reservoir
 East Lynn Reservoir
 Harpers Ferry Local Protection Project
 Henderson Local Protection Project
 Mason Local Protection Project
 Moorefield Local Protection Project
 Mud River Reservoir
 New Martinsville Local Protection Project
 Poca Reservoir
 Riverview Local Protection Project
 St. Matys Local Protection Project
 Steer Creek Reservoir
 West Fork Reservoir (Little Kanawha River Basin)
 West Fork River Reservoir (Monongahela River Basin)

NAVIGATION PROJECTS COMPLETED

Big Sandy River Navigation Project
 Kanawha River Navigation Project
 Little Kanawha River Navigation Project
 Monongahela River Navigation Project
 Ohio River Navigation Project (original canalization)

FLOOD CONTROL WORK UNDER SPECIAL CONTINUING AUTHORITIES.

Emergency Repairs and Operations:

South Branch of Potomac River and Tributaries--Farm Levees and Other Flood Control Works

Public Law 685 Projects:

Bayard
 Keyser

Snagging and Clearing Projects.

Bingamon Creek at Wyatt
 Cherry River at Richwood and Vicinity
 Elk Creek at Stonewood and Nutter Fort
 Fourpole Creek at Huntington
 Harmon Creek at Colliers
 Middle Island Creek in the Vicinity of West Union
 North Fork Hughes River at Cairo
 Polk Creek at Weston
 Stonecoal Creek at Weston

SURVEYS UNDER WAY:

Big Sandy River and Tributaries
 Buckhannon River and Middle Fork and Their Tributaries
 Buffalo Creek
 Cheat River and Tributaries
 Cherry River and Tributaries at and in the Vicinity of Richwood
 Coal River and Tributaries, Kanawha River Basin
 Deckers Creek
 Greenbrier River and Tributaries at and in the Vicinity of Marlinton
 Guyandot River
 Kanawha River in Vicinity of Charleston, South Charleston, and Dunbar
 Little Kanawha River and Tributaries
 Ohio River and Specified Reaches of Allegheny, Monongahela, and Kanawha Rivers
 Ohio River Basin Review
 Potomac River and Tributaries
 Twelvepole Creek
 West Fork River and Tributaries (Monongahela River Basin)

Office of Coal Research

To help alleviate the long-term economic distress in the Nation's coal industry, the Office of Coal Research was authorized in 1960 by Congress and was organized by the Department of the Interior in 1961.

The purpose of the Office of Coal Research is to contract for, sponsor, cosponsor, and coordinate research to develop new and more effective uses for coal, to expand present coal uses, and to reduce the cost of coal production and distribution.

The Office of Coal Research does not conduct projects with its own staff. It provides funds for research and development projects through contractual arrangements, rather than a program of grants, with universities and colleges, research organizations, mining and manufacturing firms,

qualified and equipped individuals, and other Government agencies. When appropriate, OCR may also cosponsor projects with other agencies or organizations.

Although the attack on coal problems by the OCR is nationwide in scope, its successes in research will have notable benefits for West Virginia. The Office of Coal Research has embarked on a broad program of contract research, research coordination, and stimulation of research efforts by private industry.

The need for coal research is great, and the budget is not large. The Office of Coal Research desires to obtain from its programs the greatest possible benefit to the national economy, to the coal industry, and to the American taxpayer for every dollar spent.



Fish and Wildlife Service

Trout planted in West Virginia waters annually number over one-half million and are provided sportsmen under a cooperative agreement between the West Virginia Department of Natural Resources and the Department of the Interior's Fish and Wildlife Service.

Trout produced at the three national fish hatcheries in West Virginia are pooled with trout from four State hatcheries under a single statewide coordinated trout-stocking plan. Details regarding the agreement are included in West Virginia's "Trout Water Management Directive," an attractive eight-page booklet which explains the catchable size trout allotment system and the fish-stocking policy.

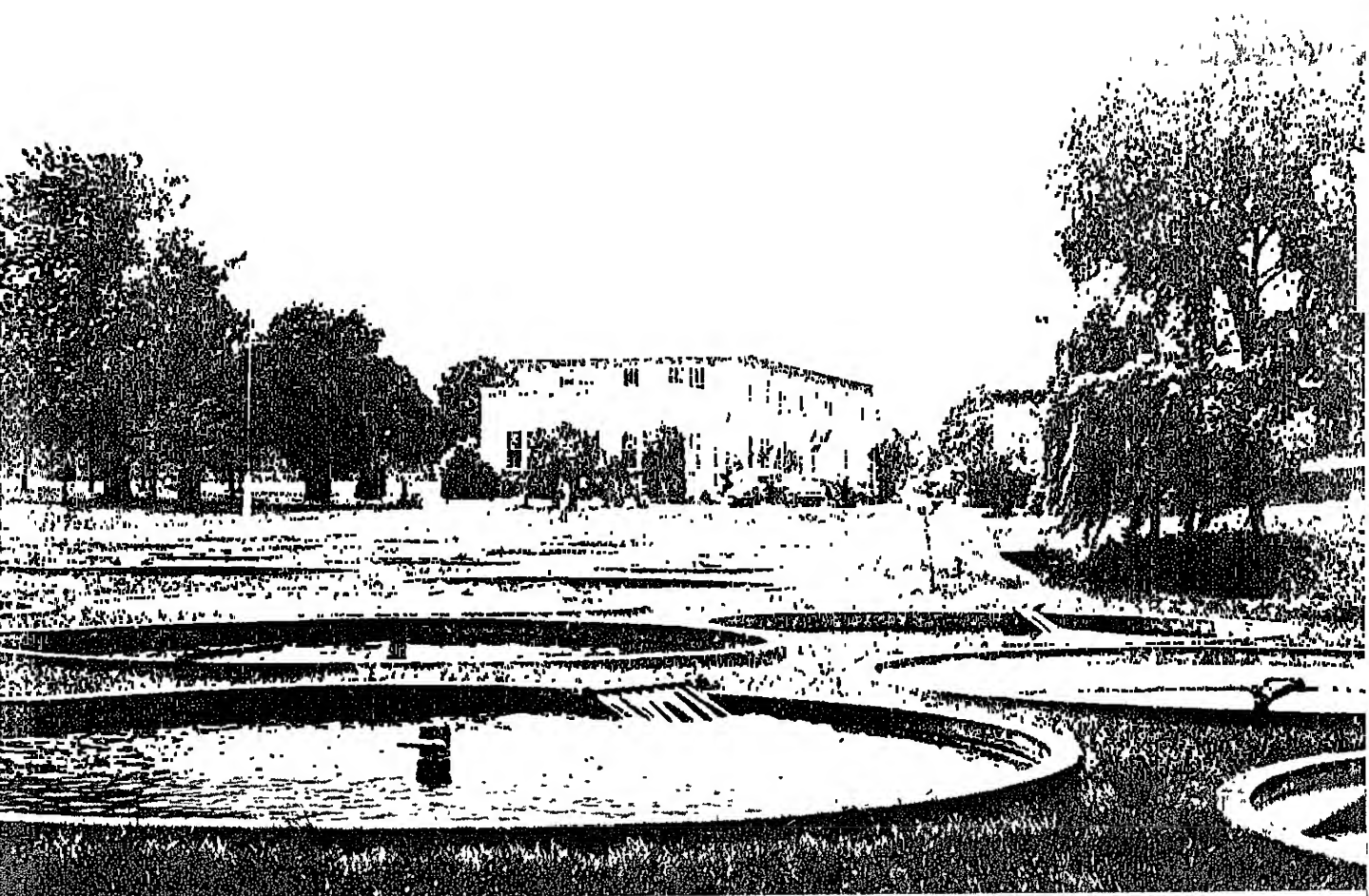
The Fish and Wildlife Service operates the Leetown, Bowden, and White Sulphur Springs

Hatcheries in northern, central, and southern areas of West Virginia.

In a typical recent year, these three stations produced about 90,000 pounds of rainbow trout, 21,000 pounds of brown trout, and 27,000 pounds of brook trout. The Federal hatcheries also produce many thousands of warm-water fish—largemouth bass and bluegill sunfish—for stocking farm ponds. The fish reared in these three Federal hatcheries are stocked in national forests and public water, primarily in West Virginia, but some also are sent to Pennsylvania, Maryland, and Virginia.

River Basin Studies

The Fish and Wildlife Service is contributing to greater hunting and fishing opportunities in



Circular trout tanks are used at the Leetown National Fish Hatchery, one of three hatcheries administered by the Fish and Wildlife Service in West Virginia. The hatcheries produce many thousands of trout, bass, and bluegill sunfish.

West Virginia by assisting in the water development plans for several of the basins. The principal agencies with whom the Service works are the Army Corps of Engineers and the Soil Conservation Service of the Department of Agriculture.

Fish and Wildlife Service reports are coordinated with the West Virginia Department of Natural Resources and provide guidelines and recommendations which will assist the planning agencies in developing project patterns that will minimize the losses and maximize the benefits to fish and wildlife resources. The field investigations and preparation of reports are accomplished by two area offices; the office in Trenton, N.J., is responsible for that portion of West

Virginia lying in the Potomac River drainage, while the office at Pittsburgh, Pa., is responsible for the Ohio River drainage comprising the remainder of the State.

The Service utilizes cooperative agencies in the State to disseminate to the public information on the control of injurious mammals and birds.

The Service has a U.S. Game Management Agent stationed in West Virginia. This agent enforces Federal Conservation Regulations for which the Service is responsible. The agent is assisted by approximately 75 State Wildlife Conservation employees who are commissioned as U.S. Deputy Game Wardens. Wildlife management surveys regarding migratory birds

and banding programs on waterfowl, mourning doves, and nongame birds are coordinated and supervised by the Federal agent. He also advises farmers and property owners in cases of migratory bird depredation of agricultural crops.

Federal Fishery Aid Programs

Under a nationwide program financed by taxes on arms and ammunition, States are apportioned money for wildlife research and management and for purchasing and developing land and water areas for wildlife. Two long-range projects in West Virginia are typical of those underway. One is centered in the Monongahela and the George Washington National Forests. It covers construction of roads, planting of food plots, trapping, tagging, and transporting deer, wild turkey, and bear, the taking of game censuses, managing hunting, and evaluating wildlife resources.

The other project is a statewide farm game development program of planting trees, shrubs, and food plots. Studies are conducted in production, harvest, and counting of forest game, white-tailed deer, and migratory birds.

In an average year, West Virginia receives more than \$200,000 in Federal wildlife restoration funds.

Another Federal excise tax—on sport fishing equipment—helps finance fishery programs in various States. West Virginia receives an average of \$50,000 a year as its share of the tax and uses it to study diseases in trout hatcheries, to survey fishing conditions, and to test stream-improvement methods to encourage growth of game fish.

Fishery Management Services Program

A fishery management services office, staffed by fishery biologists, is being reestablished at the Bowden National Fish Hatchery in Randolph County.

The program will include fishery surveys in the George Washington and Monongahela National Forests, determining the suitability of waters for stocking, and studies of acid mine pollution and pollution abatement.

West Virginia Commercial Fisheries

The Service conducts certain activities in West Virginia to stimulate the use of domestically produced fishery products. It also conducts consumer-education activities directed at developing new markets and expanding traditional markets for fishery products produced in all sections of the country. An important aspect



Visitors to Leetown National Fish Hatchery view an exhibit of thousands of trout fingerlings in rearing troughs.

of this consumer education program is statewide fish cookery demonstrations by the Service's professionally trained home economists and marketing specialists as a service to school lunch supervisors and other institutional cafeterias and restaurants.

Also, the Fishery Market News Service regularly collects and disseminates currently accurate and complete marketing information on fishery products, current trends, developments, and research findings in this country and foreign countries that are of interest to the fishery and allied industries of the United States. In West Virginia the type of Market News information published is of interest to all handlers of fishery products.



Forest Service

The Forest Service of the Department of Agriculture works in three major fields that affect the resources of West Virginia: administration of the Monongahela and George Washington National Forests; cooperation with the State Forester and the State Department of Natural Resources in programs for management and protection of State and private forest lands; and research in forestry and related fields.

National Forest Administration

The Monongahela National Forest and a portion of the George Washington National Forest include 903,985 acres of federally owned land within West Virginia. They are administered by forest supervisors with headquarters at Elkins, W. Va., and Harrisonburg, Va., under the general supervision of the Regional Forester in Upper Darby, Pa.

A Forest Service ranger samples the Cherry River as part of research in Monongahela National Forest.





Under its management and protection program, the Forest Service surveys hardwood timber stands in West Virginia's national forests.

The Monongahela National Forest includes over 800,000 acres located on the headwaters of the Monongahela, Potomac, and Greenbrier Rivers. The George Washington National Forest is mainly on the ridges flanking the Shenandoah Valley, but almost 100,000 acres extend into West Virginia to protect the headwaters of the Cacapon River, a major tributary of the Potomac.

The national forests are managed for a sustained yield of their natural renewable resources for the greatest long-range benefit to the public. Healthy forest cover keeps the many rivers and streams clean and insures steady flow of water. The national forests contain 818,000 acres of commercial forest in which are growing more than 1.6 billion board feet of sawtimber and an even greater volume of young stock. The national forests include some of West Virginia's best and most popular hunting and fishing areas, and offer many other opportunities for outdoor recreation; each year more than a million recreation visits are made to these national forest areas.

Demands for all national forest resources have grown at an unprecedented rate in recent years so that management and protection activities must be stepped up rapidly. The Forest Service has embarked on a "Development Plan for the National Forests," by which it plans to meet these new demands at levels anticipated by 1972, and to develop long-term planning for the year 2000.

In terms of on-the-ground work, the development program will mean construction of nearly 400 campgrounds, picnic sites, and other recreation facilities; nearly 100 wildlife watering facilities; approximately 180 miles of rehabilitated fishing streams; and about 26,000 acres of improved small and big game range. Revegetation of over 10,000 acres of grazing land, construction of 380 miles of forest development roads and some 30 miles of trail, and many other major protection measures and resource improvements are also included in the program.

State and Private Cooperation Continues

The Regional Forester works with the State Director of Natural Resources and the State Forester in a number of programs designed to promote better management and protection of State and private forest land. They include forest fire prevention, forest fire control, tree planting, forest management, flood prevention, watershed protection, and rural area development. Cooperative programs for control of forest insects and disease are carried out with the State Entomologist, State Department of Agriculture.

Except for some pest control activities directly managed by the Forest Service, State officers administer these programs. The Forest Service provides financial, planning, and technical assistance. Cooperative conservation programs are also carried out through local Soil Conservation Districts and Agricultural Stabilization and Conservation Committees.

Under the cooperative programs the State Forest Tree Nursery at Paison shipped 4,357,000 seedlings in a recent year; the State forest fire control organization protects 9 million acres of State and private land; extensive programs are conducted to control or eradicate white pine blister rust and oak wilt, flood prevention and watershed projects are authorized in 9 small watersheds under Public Law 566; and flood prevention work is authorized in connection with the Potomac River Flood Control program. In addition, forest industry in 21 counties has been aided by rural area development projects designed to revitalize the rural economy.

Forest and Range Research

Many Forest Service research projects directly affect the use and development of West Virginia's natural resources. In the main, such research is the responsibility of the Northeastern Forest Experiment Station at Upper Darby, Pa., although some of the research conducted by the Southeastern Station at Asheville, N.C., and by the Central States Station at Columbus, Ohio, is also applicable to resource management in West Virginia.

Research covers forest management, forest insects and disease, watershed management, outdoor recreation, wood uses and products, and forest economics. Much of the work is conducted through projects located in field laboratories and on experimental forests. One such project studies forest economics—products and markets—from headquarters at Princeton, W. Va. From Elkins, another project studies the management of Appalachian hardwoods—how to cut them and their reforestation.

Other research projects that apply particularly to West Virginia are studies of problems in reforestation of coal mine spoil banks and mountain watershed management. Knowledge gained by such research is being put to practice on private, State, and Federal land within West Virginia as a means to rehabilitate the soil and create potential forested recreation sites. Continuing research will unlock new opportunities for the better development of the State's natural resources.



Geological Survey

West Virginia was one of the first States to recognize a need for high-grade accurate maps depicting the physical configuration of the land, including changes brought about by the work of man. Consequently, as early as 1899 when the Interior Department's Geological Survey was scarcely 20 years old, the Mountain State entered into a cooperative agreement whereby it became the first State to be completely mapped. The work was finished and the final map in the series was published in 1925.

The need today, however, is mostly for larger scale maps with greater detail; hence the 1899 to 1925 edition now is considered largely obsolete. Again operating under impetus from the State, a new mapping program has been started to resurvey the State and turn out a new series of topographic maps at 1:24,000 scale (1 inch equals 2,000 feet).

The primary need for the original cooperative mapping program in West Virginia was for a study of mineral resources. The topographic mapping program was coordinated with geologic and mineral investigations. In addition to the topographic quadrangle maps, this program resulted in the publication of several geologic folios and spawned a variety of reports on West Virginia coal and other mineral resources.

Because rugged terrain made some areas rather inaccessible to exploration and development, availability of topographic maps and geologic reports was a major factor in the early discovery and development of the coal and other mineral resources of the State and the attendant industrial expansion.

The new mapping program was justified by the need for topographic maps of larger scale to aid in developing modern highways, locating potential industrial sites, and revising mineral resources studies to bring them up to date. Other uses for these maps scaled at 2,000 feet to the inch include planning wildlife conservation, developing new recreation areas, expanding current investigations of water resources of both surface and ground water, and planning flood control measures.

The current cooperative agreement with West Virginia calls for \$100,000 in annual contributions by the State, matched by Federal funds. So far, about half the State has been included in this modern program and about 80 new 7½-minute maps have been published. According to present plans, the balance of the State will be remapped in 7½-minute quadrangles by 1967.

The entire State is also covered by 11 maps of the new 1:250,000-scale topographic series maps,

maintained by periodic revision as a part of the national mapping program. In these maps, 1 inch represents approximately 21,000 feet, or about 4 miles.

Oil and Gas Conservation Activities

Under Federal laws, the Department of the Interior's Geological Survey exercises supervision over 126 oil and gas leases embracing about 154 acres of acquired lands in West Virginia.

All production on Federal land has been from the Gladys field in Randolph and Pocahontas Counties on which there are 26 producible gas wells under Federal supervision. However, since July 1, 1960, the field has been substantially shut in to conserve "cushion gas" for a proposed gas-storage project.

There are no withdrawn mineral lands in West Virginia; however, the Geological Survey acts as a consultant in the supervision of Federal mineral interests in the national forests.

Geologic Programs

A study of the Cenozoic history and development of the Shenandoah Valley is being completed. It is designed to provide background for evaluating hydrologic concepts and in turn to apply hydrology to the study of land forms. The area covered by this study includes a small part of easternmost West Virginia.

Information on non-Federal geologic work in progress in West Virginia can be obtained from the West Virginia Geological and Economic Survey in Morgantown.

Information on the various geologic and topographic maps, mineral resources maps, water resources reports, and other geological survey publications relating to West Virginia can be obtained by writing the Director, Geological Survey, Department of the Interior, Washington D.C. 20240.



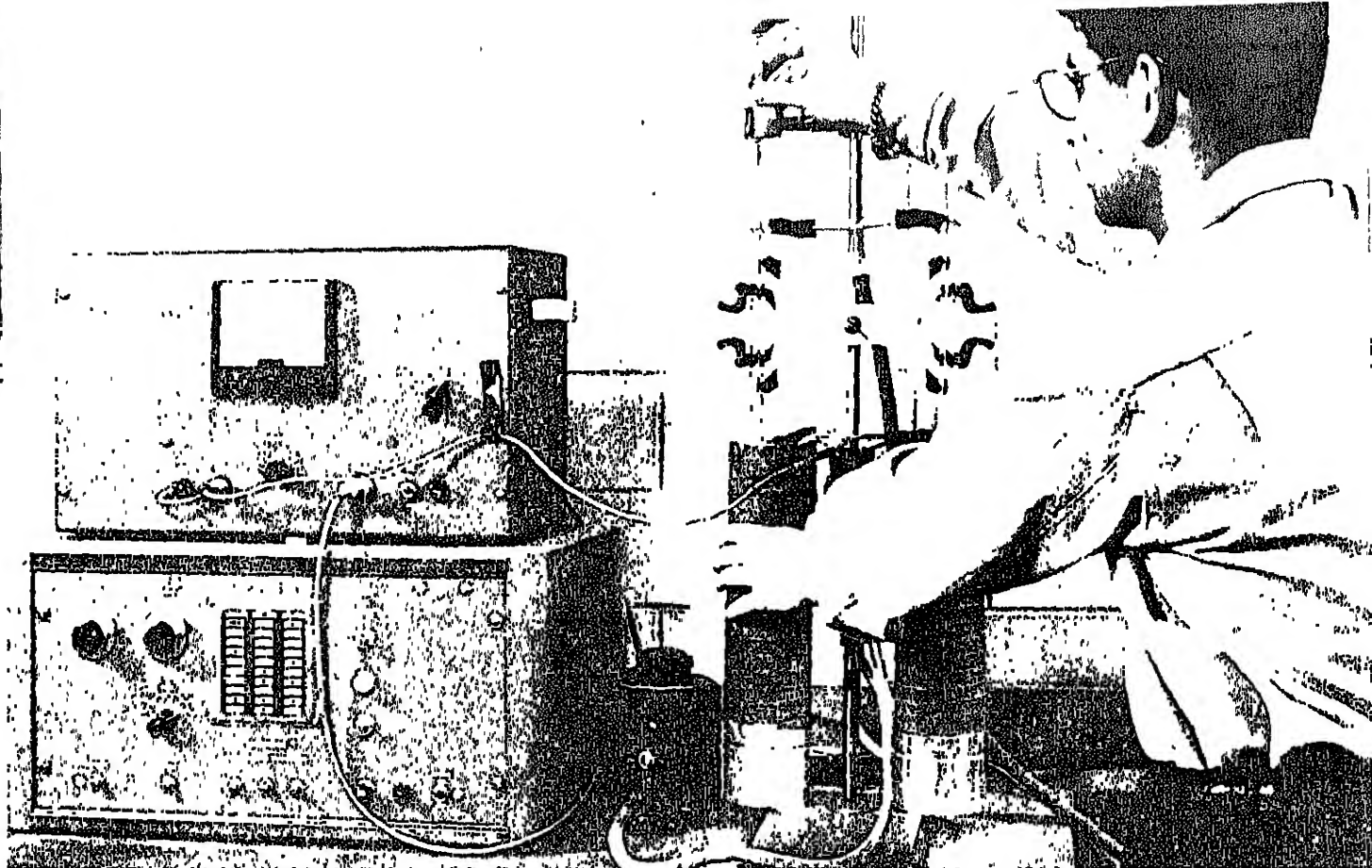
Bureau of Mines

The Department of the Interior's Bureau of Mines long has recognized the significant contributions of West Virginia to the Nation's mineral wealth. In cooperation with State agencies and industry, the Bureau works to promote wise development and use of all mineral resources in West Virginia and to advance safe and healthful practices in the State's numerous mines and mineral-processing plants.

Research on bituminous coal, petroleum, and other minerals is carried on at the Bureau's center in Morgantown. Health and safety activities are conducted at field headquarters and testing laboratories at Mount Hope and subdistrict headquarters at Morgantown.

To help insure full development and use of the Mountain State's vast coal resources in an era of rapidly changing technology, the Bureau of Mines seeks improved productivity, higher quality, and more efficient utilization of coal at lower cost. Safer and more economical extraction of coal is the object of studies to develop methods of degasifying coal beds in advance of mining, and research on hydraulic mining and transportation of coal.

A better quality product for the coal consumer is being sought through experiments seeking new or improved preparation techniques. Additional markets and a broader area of use for coal are hoped for as a result of intensive pro-



This Bureau of Mines scientist uses modern equipment in studying coal far at the Morgantown Research Center.

Research on bituminous coal, petroleum, and other minerals is conducted at the Bureau of Mines center in Morgantown.



grams aimed at perfecting processes for making synthetic liquid fuels and chemicals from coal and at developing a coal-fired gas turbine for generating electricity in stationary power plants.

Petroleum Studies

West Virginia's oilfields lie within the oldest petroleum-producing region of the United States, and although the underground reservoirs in which Nature stored this essential fuel are far from empty, the natural reservoir pressures that once helped drive oil to the surface are depleted. Free-flowing production cannot be maintained with conventional primary methods. Therefore, Bureau of Mines researchers are helping the State's petroleum industry adopt effective secondary-recovery techniques, such as gas and air injection and, where practicable, water-flooding.

This work, with related investigations, is designed to increase ultimate oil recovery, solve transportation and storage problems, improve processing methods, and promote

greater efficiency in the use of oil and natural gas.

Health and Safety Activities

The Bureau of Mines conducts a varied health and safety program in West Virginia. It tests and approves mining equipment for safe use in underground mines, performs research to determine the occurrence and hazards of mine gases, seeks better methods for supporting mine roof and for improving mine-ventilation and dust-control practices, provides accident-prevention training for miners and mining officials, and carries on continuing studies to develop gas- and radiation-detection devices, and to promote safe use of explosives and blasting equipment.

In addition, the Bureau employs a staff of highly trained coal mine inspectors who fulfill the Government's responsibilities under the Federal Coal-Mine Safety Act. Samples of mine dust and mine atmospheres collected by these inspectors in States east of the Mississippi are tested by the Bureau at Mount Hope for flammability and toxicity.



National Park Service

The National Park Service administers Harpers Ferry National Historical Park and Chesapeake and Ohio National Monument in West Virginia.

Under a continuing long-range program of development of areas in the National Park System, the Service is moving forward with improvement plans for Harpers Ferry. For example, a new Visitor Center has been opened on Shenandoah Street. The old Stage Coach Inn was remodeled to provide better visitor facilities, yet Harpers Ferry Street retains its 19th century look. Harpers Ferry serves as an excellent introduction to West Virginia's role in the Civil War.

The Park Service has also added Storer College to the park. Some of the College buildings form

a training center where park personnel—particularly historians, naturalists, and archeologists—receive advance training in interpretive and related techniques.

The Harpers Ferry area, with its varied terrain, historical features, restoration and archeological projects, and visitor services program, affords the trainees an opportunity for varied experience in many programs.

John Brown's Fort is on the campus of Storer College and is a museum of Civil War material, as well as a repository for a valuable collection of minerals.

Harpers Ferry, apart from its historical significance, has another claim to fame—Thomas Jefferson thought the view of the



Buildings pre-dating the Civil War line the streets of colorful Harpers Ferry, administered by the National Park Service as a national historical park.

confluence of the Potomac and Shenandoah Rivers was "one of the most stupendous scenes in nature."

By 1966, visitors to the State of West Virginia will find many projects completed for public use and enjoyment as well as interpretation of the area. These facilities include improved roads and regulation of traffic, rehabilitation and restoration of historic structures, and alterations and rehabilitation of Storer College, including historical, archeological, and architectural research.

Although only 3.4 acres of the famous Chesapeake and Ohio Canal National Monument lie in West Virginia, the State is an important gateway to the scenic area, most of which lies in Maryland. The Chesapeake and Ohio Canal is one of the least changed of the older American canals and is typical of the Nation's most important forms of early transportation. The canal originally was inspired by George Washington, who, as early as 1754, fostered a system

of river and canal navigation along the Potomac Valley. He was largely responsible for organization of the Potomac Company in 1785 to carry out this plan. As first president of the company, Washington was actively engaged in the project. The canal is 184.5 miles long and reaches from Washington, D.C., to Cumberland, Md.

The Department of the Interior's future plans for West Virginia include 420 miles of the proposed Allegheny Parkway with its northern terminus at Harpers Ferry. The route would follow the Potomac River northwesterly, ride the escarpment crest of the Allegheny Front, traverse Monongahela and George Washington National Forests and State forests and parks, and pass near established resort areas. Campgrounds and picnic areas are planned along the route.

The real accomplishments of the Park Service's long-range programs are measured, not by improved roads, restoration of historic sites, or by the number of new visitor centers, but by how well the program as a whole accomplishes the purpose of national parks—to preserve the Nation's heritage in wild lands, scenery, and historic treasures for the enjoyment and inspiration of Americans.



Bureau of Outdoor Recreation

Although the Bureau of Outdoor Recreation manages no lands, recreation areas, or facilities, its functions are important to residents and visitors to every State.

The Bureau provides a focal point for outdoor recreation programs and related activities in the Federal Government. It serves as a point of contact on recreation matters for regions, States, and their political subdivisions, organizations, and individuals. West Virginia has named the Department of National Resources, Capitol Building, Charleston, as a contact point to work with the Bureau in future State-Federal recreation planning and development.

Creation of a Federal Bureau of Outdoor Recreation was one of several recommendations resulting from 3-year studies by the Outdoor Recreation Resources Review Commission of America's outdoor recreation resources, needs, and demands. Congress authorized the Outdoor Recreation Resources Review Commission studies in 1958. The Commission reported and made some 50 recommendations in January 1962. President Kennedy directed creation of the Bureau a month later, and Secretary of the Interior Stewart L. Udall established the Bureau of Outdoor Recreation April 2, 1962. A year later, Congress enacted Public Law 88-29, a

basic outdoor recreation law, and President Kennedy signed the statute May 28, 1963.

Public Law 88-29 states in its preamble that Congress "finds and declares it to be desirable that all American people . . . be assured adequate outdoor recreation resources, and that it is desirable for all levels of Government and private interests to take prompt and coordinated action to the extent practicable . . . to conserve, develop, and utilize such resources for the benefit and enjoyment of the American people."

The new law directs the following:

Preparation and maintenance of a continuing inventory of the outdoor recreation needs and resources of the United States;

Preparation of a system for classifying outdoor recreation resources;

Formulation and maintenance of a nationwide outdoor recreation plan;

Provision of technical assistance to and cooperation with the States, their political subdivisions, and private interests,

Encouragement of interstate and regional cooperation in outdoor recreation planning, acquisition, and development;

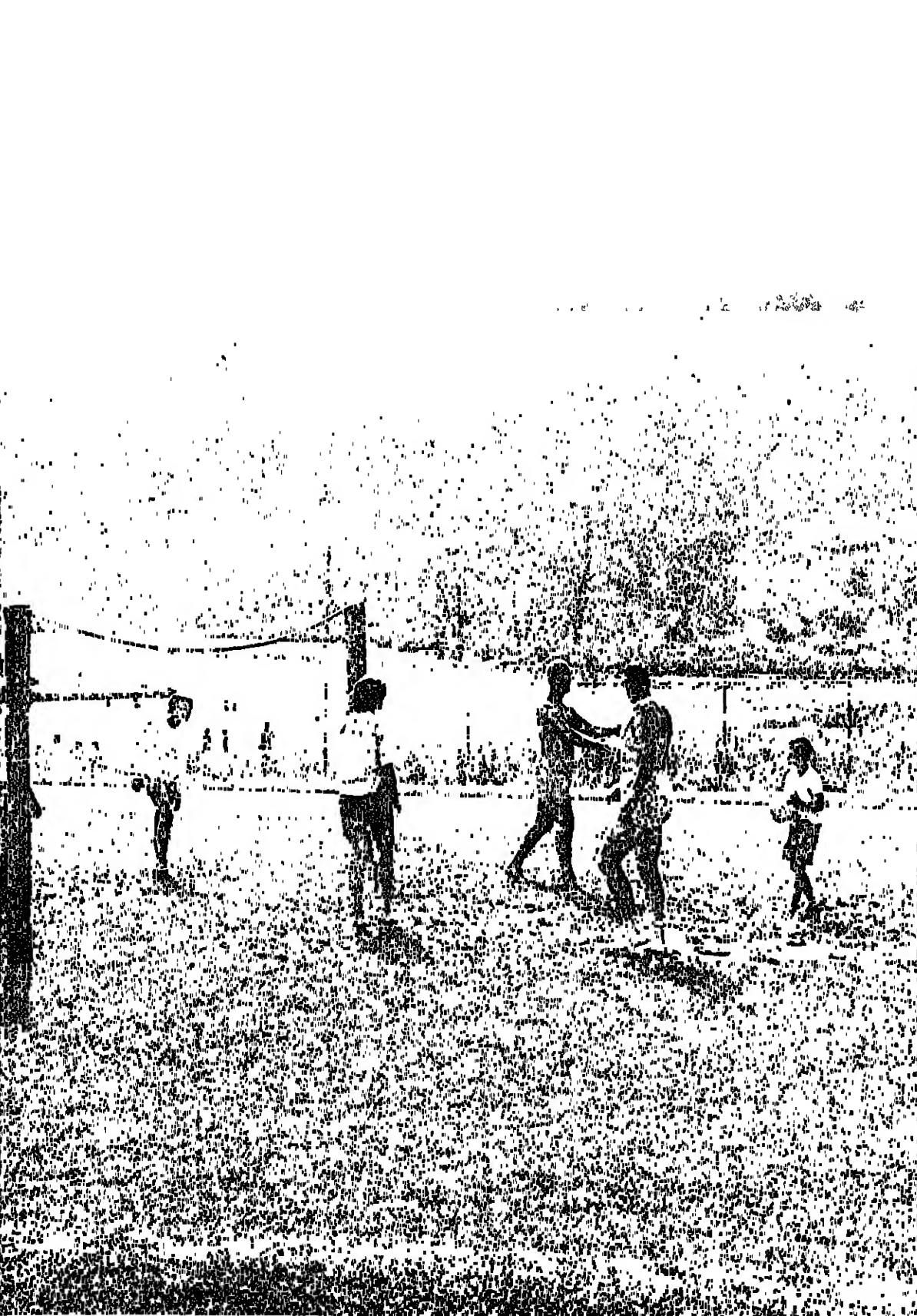
Encouraging interdepartmental cooperation and promotion of coordination of Federal plans and activities generally relating to outdoor recreation; and

Acceptance and use of donations for outdoor recreation purposes.

Authority for these activities resides in the Secretary of the Interior and has been delegated by him to the Director of the Bureau of Outdoor Recreation. These authorities provide means for stimulating increased Federal, regional, State, and local outdoor recreation activity. The program is particularly designed to strengthen States in their key role of providing for the future recreation needs of their citizens.

West Virginia is a mecca for outdoor enthusiasts. Its parks offer such recreation as swimming, boating, sunning, hiking, camping, and numerous sports.



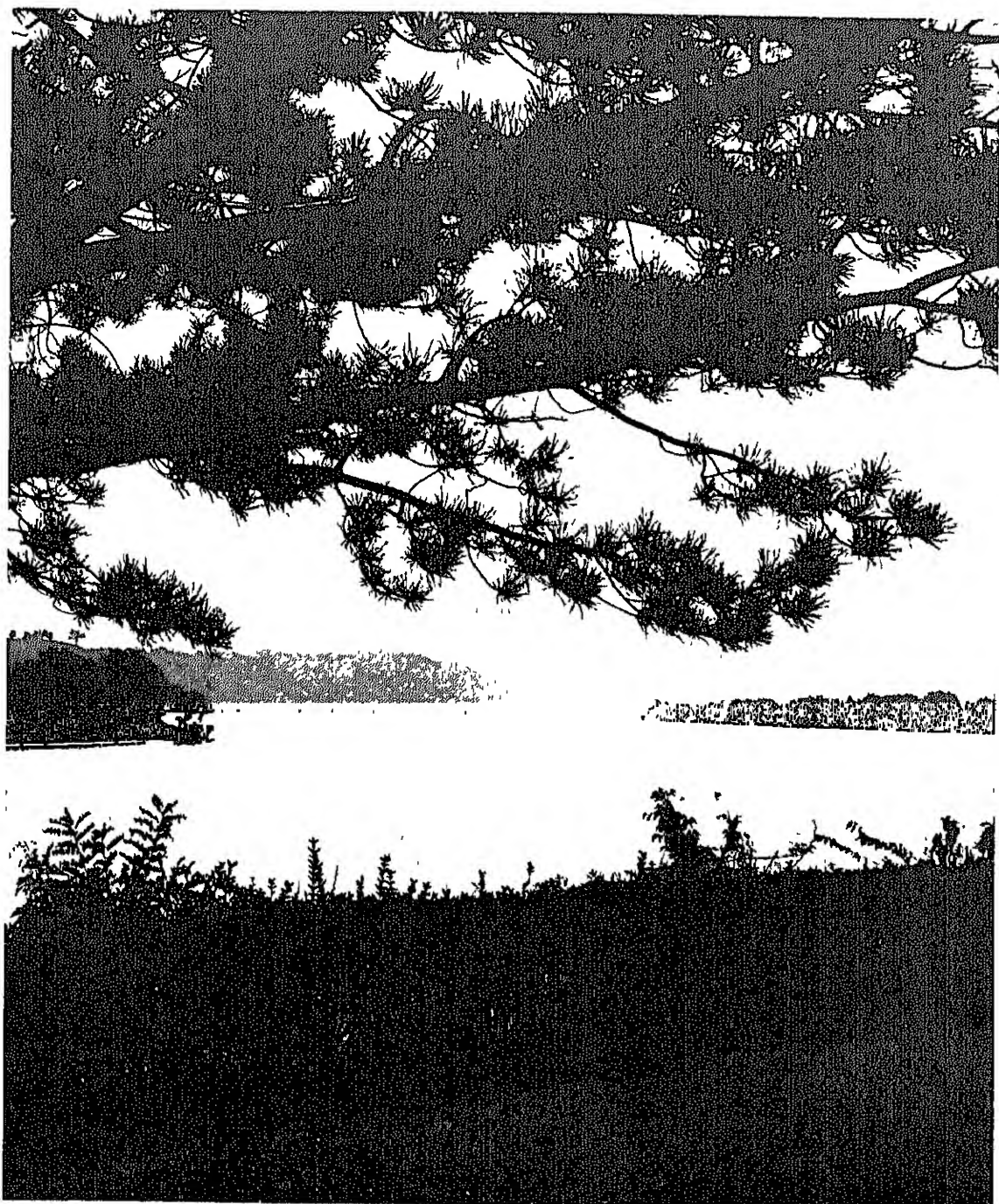


The Future

West Virginia, the Mountain State, is a beautiful area, filled with bountiful natural resources—water, minerals, wildlife, recreational potentials, and, of course, highly developed human resources. Throughout the State's colorful history, the independence and aggressiveness of its people stand out as important in the annals of American culture.

The citizens of West Virginia are to be saluted for their past and present efforts to improve their State, and, most assuredly, the Nation looks forward to the progressive future of the Mountain State.

Natural resource agencies of the Federal Government have contributed importantly to West Virginia's growth, and their efforts, in cooperation with State and local agencies, will continue in the years to come.



ACKNOWLEDGMENTS

The Department of the Interior gratefully acknowledges the cooperation of the following organizations in providing illustrations for this publication:

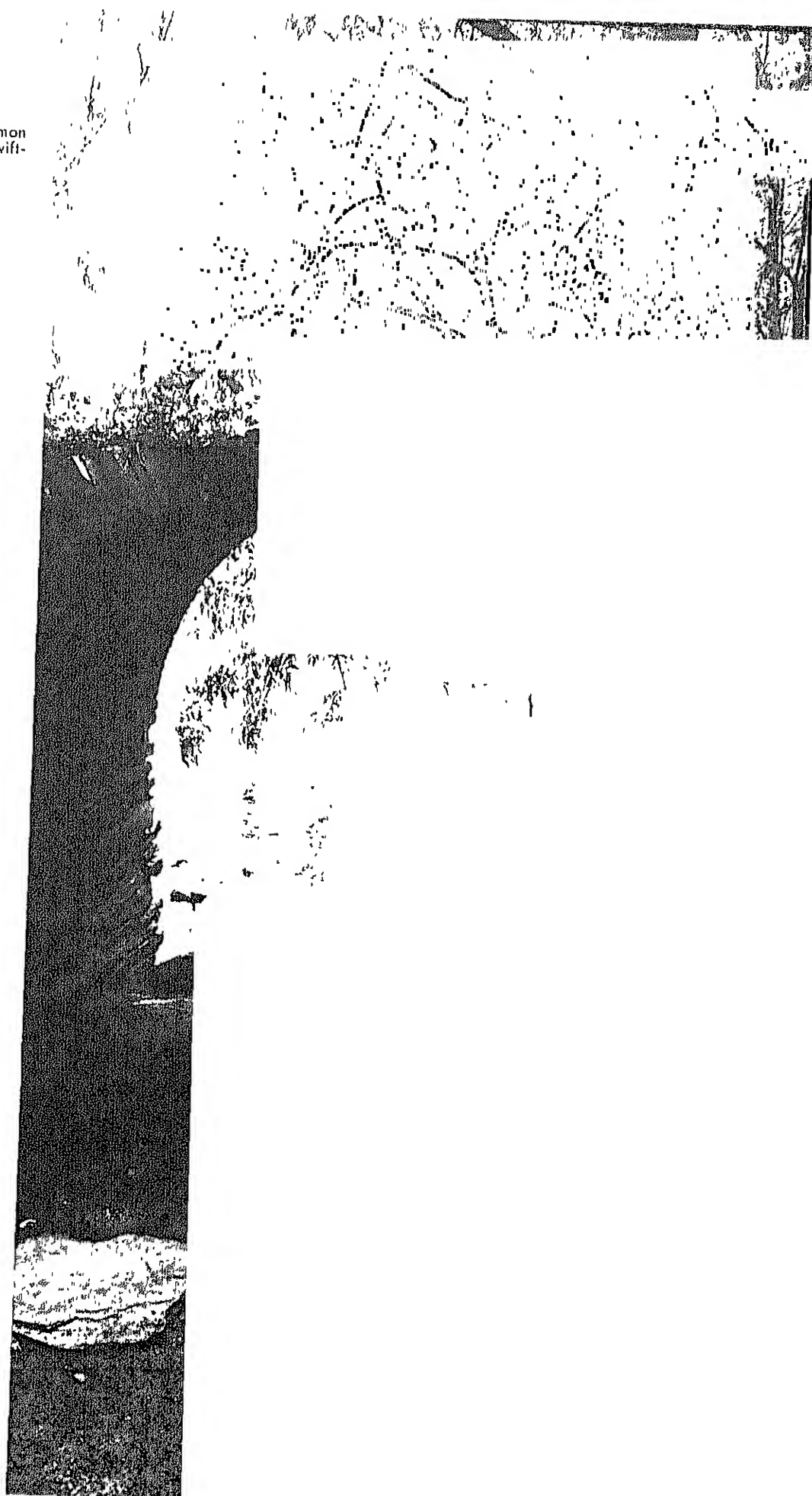
U.S. Army Corps of Engineers, pp. 29, 44, 46; Forest Service, Department of Agriculture, inside front cover, pp. 2, 12, 23 (bottom), 24 (bottom), 32 (top), 51, 52, National Geographic Magazine, pp. 6, 10, 22, 24 (top), 33, 35, West Virginia Chamber of Commerce, back cover, pp. 26, 28; West Virginia Department of Commerce, front cover, pp. 2, 5, 19, 23 (upper right), 32 (bottom), 61, 63, West Virginia University, pp. 21, 23 (upper left), 25, Wheeling Area Conference on Community Development, Inc., pp. 9, 39.

The Department also expresses its appreciation to the Forest Service, Department of Agriculture, and the U.S. Army Corps of Engineers for assisting with the text.

The "Natural Resources of West Virginia" is one of a series of publications on various States. Similar booklets on the States of Montana, Washington, Colorado (each 50 cents), Ohio, Arizona, Massachusetts (each 45 cents) are also for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 Price 45 cents

(Back cover) Waterfalls are common along West Virginia's many swift-flowing mountain streams.



(Right) Ruins of a water raceway, once used by early industry, make a pleasant scene at Harpers Ferry.